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A COURSE IN AIR FORCE
LOGISTICS HISTORY SINCE 1940
THESIS

Karen S. Wilhelm
Captain, USAF

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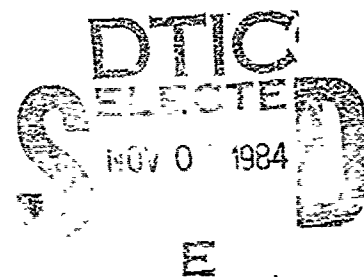
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A COURSE IN AIR FORCE
LOGISTICS HISTORY SINCE 1940

THESIS

Presented to the Faculty of the School of Systems and Logistics
of the Air Force Institute of Technology
Air University
In Partial Fulfillment of the
Requirements for the Degree of
Master of Science in Logistics Management

Karen S. Wilhelm, B.S.
Captain, USAF

September 1984

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Preface

The purpose of this research was to provide a resource to the AFIT School of Systems and Logistics for the teaching of Air Force logistics history. I strongly believe the lack of any such history course is a deficiency requiring immediate rectification. An appreciation of historical experience is essential to a military professional, and it must be the responsibility of Air Force educational institutions to provide that sense of appreciation.

I wish to thank Mr. Jerry Peppers, who has served as my faculty advisor in this research effort. Without his patience, support, encouragement, and understanding, this project would have been far more difficult to complete.

Karen S. Wilhelm

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Abstract

↙ The objective of this research was to design a three quarter hour, graduate level course in Air Force logistics history since 1940. This effort was a continuation of a previous thesis effort which identified approximately 450 bibliographic references. These references were then used as a basis for designing lesson plans, lecture outlines, and a student syllabus, and identifying student reading assignments.

A COURSE IN AIR FORCE LOGISTICS HISTORY SINCE 1940

I. Introduction

General Issue

When a Chief of the Imperial General Staff wrote that 'he had never had time to study the details of military history'...it was as if the President of the Royal College of Surgeons said he had never had time to study anatomy, or do any dissection.

Sir B.H. Liddell Hart (16:32)

An effective, well-rounded military officer must have an appreciation of military history. The initiation of Project Warrior by former Air Force Chief of Staff, General Lew Allen, Jr., explicitly supports this assertion. Implicit in the initiation of Project Warrior was the assumption that many Air Force members did not have a sufficient appreciation of or knowledge of military history. Many present and former Air Force leaders support this assumption and the necessity to rectify this situation. In addition to this lack of knowledge of military history, many Air Force members lack actual war-fighting experience.

This lack of experience is evident among officers in logistics career fields. According to officials at the Air Force Manpower and Personnel Center, lieutenants and captains in the aircraft maintenance officer career field (for example) are manned at approximately 400% of requirements, while majors and lieutenant colonels are manned at 60 to 70%. Similar comparisons prevail in a majority of logistics career fields. Thus, a significant proportion of those officers in logistics specialties have entered the service since the end of the Vietnam War. It follows, then, that these officers have no wartime experience upon which to base their current and future decision-making. The study of military history provides a primary method of overcoming this lack of experience.

• Programs such as Project Warrior address the issue of overcoming lack of experience through the study of military history. The issue, however, is of such importance that a more formal, systematic approach becomes necessary. One avenue of formal study comes through the educational system of Air University, a part of which is the Air Force Institute of Technology (AFIT), School of Systems and Logistics. Given the above statistics concerning the inexperience of officers in logistics specialties, the issue can be narrowed to the lack of knowledge of military logistics history among Air Force officers in logistics career fields.

Statement of the Problem

The problem which arises from the identification of this issue is that the School of Systems and Logistics offers no course in military logistics history.

Background

General Douglas MacArthur clarified this need for a historical perspective in military operations:

More than most professions, the military is forced to depend on intelligent interpretation of the past for signposts charting the future. Devoid of opportunity, in peace, for self-instruction through actual practice in his profession, the soldier makes maximum use of the historical record in assuring the readiness of himself and his command to function efficiently in emergency. The facts derived from historical analysis, he applies to conditions of the present and the proximate future, thus developing synthesis of appropriate method, organization, and doctrine. (21:Backcover)

This perspective is, perhaps, truer now than ever before. A study of historical trends helps explain present circumstances and shows where projections will lead unless elements causing the trends change or have changed (16:37). Other writers have contributed to this theme of studying the past to learn for the present and the future. One of the foremost writers on logistics, Rear Admiral Henry E. Eccles, Ret. has said "the history of war is full of the disastrous consequences of taking things for granted and of

refusing to learn from past experience (26:23)." In the late 1800's, Rear Admiral Stephen B. Luce, the first president of the Naval War College advocated using military history to teach the science of naval warfare (30:201). The reasons for doing so are no less valid now than they were then. The following gives a more recent example of the advantages of a familiarity with history. After reading how World War I started when no one would back down, President Kennedy sought to avoid war during the Cuban missile crisis by consciously affording Khrushchev an avenue of graceful retreat (16:43). Perhaps the missile crisis would have concluded much differently if he had not had this historical background upon which to base his decisions. The above justification for the study of military history carries over into the more narrow field of logistics history.

It is just as important for logisticians to study history as for those in other military specialties. Writers of military history, however, have ignored logistics history to the point of making it one of the most neglected topics in military literature. It has become fashionable to make a bow toward logistics in current literature, but this is not enough (3:i). "Elements of logistics run through all military operations from the time of the first thought until the bombs are dropped on the enemy (3:ii)"; therefore, "all commanders must have a sound general knowledge and appreciation of logistics (3:i)."

Two writers who have written on logistics history had this to say about its neglect by other military historians. Martin Van Creveld notes that logistics history

is so often ignored by military historians. The result is that . . . armies frequently seem capable of moving in any direction at almost any speed and to almost any distance once their commanders have made up their minds to do so. (61:2)

Van Creveld goes on to point out, as an example, that while "Napoleon's strategy and tactics have attracted whole swarms" of writers, no one has analyzed in detail the logistics of his campaigns (61:2). James Huston has written in a similar vein: "Too often . . . Great armies appear, full-blown, from nowhere, do battle, then disappear (32:ix)." Huston also provides a succinct, yet excellent, rationale for the study of history in general, and logistics history in particular:

It is a function of military history to provide rich experience out of which imaginative leaders will create new methods to meet new situations. Today, as a basis for decisions of public policy and military action, civilians as well as the military require some experience in military logistics. (32:ix)

In studying logistics and logistics history, it becomes necessary to define the term since it encompasses many related concepts. Antoine Henri Jomini first used the term "logistics" in 1838 as he wrote about Napoleon's campaigns. Jomini formulated a theory of war based upon a

coequal triumvirate of strategy, grand tactics, and logistics (34:3). Huston traces the term from the Greek "logistikos" meaning "skilled in calculating." It was first used in connection with military operations in Roman and Byzantine times when there was an official with the title "Logista," which apparently implied a skill in mathematical computations (32:692). The term came into modern usage, chiefly by the French, during World War I, and was used by military forces throughout the world in World War II (43:viii).

With widespread acceptance and use of the term came a plethora of definitions. There is, however, no commonly agreed upon definition. A brief survey of the literature will serve to illustrate this point. A specific definition seems to be neglected even in writings about logistics topics. Even when writers discuss a definition, it is usually only in a cursory manner. For example, Van Creveld, in his book Supplying War: Logistics from Wallenstein to Patton, devotes only the first two paragraphs of his introduction to a definition of logistics (61:1). In The Sinews of War: Army Logistics 1775-1953, James Huston discusses his definition only in the first two pages of his preface (32:vii-viii). These same writers criticize other military historians for ignoring logistics (61:2; 32:ix), while an equally valid criticism could be levied against them for writing about the subject while virtually ignoring its definition.

The various definitions found during this review can be divided into two general categories. The first is formal definitions found in assorted reference works. The second is less formal definitions found within works on logistics topics. The most comprehensive and detailed of the formal definitions was found in the Compendium of Authenticated Systems and Logistics Terms, Definitions and Acronyms published by the AFIT School of Systems and Logistics, hereafter referred to as the Compendium. The Compendium is comprised of definitions obtained from official publications of the military services and federal agencies, and in the case of two or more definitions of the same term, all are included (17:iv,vi). The term "logistics" has four separate definitions. They will be reproduced here to provide a starting point for the discussion and to illustrate the diversity in definitions. The Compendium defines logistics as

The science of planning and carrying out the movement and maintenance of forces. In its most comprehensive sense, those aspects of military operations which deal with: a. design and development, acquisition, storage, movement, distribution, maintenance, evacuation, and disposition of materiel; b. movement, evacuation, and hospitalization of personnel; c. acquisition or construction, maintenance, operation, and disposition of facilities; and d. acquisition or furnishing of services. (JCS Pub 1, AR 320-5, AFP 800-7)

(Materiel and Services.) The functional fields of military operations concerned with: 1) materiel requirements; 2) production planning and scheduling; 3) acquisition, inventory management, storage, maintenance, distribution and disposal of materiel, supplies, tools, and equipment; 4) transportation, telecommunications, petroleum,

and logistical services; 5) supply cataloging, standardization, and quality control; 6) commercial and industrial activities and facilities including industrial equipment; 7) vulnerability of resources to attack damage. (DOD 5000.8)

The phase of military operations involving procurement, delivery, storage, shipment, and scheduling of military supplies, including personnel. (AFLCM 72-2)

The determination of initial and follow-on requirements and the procurement, storage, transportation, distribution, maintenance, quality control, and disposal of material and related services for the military forces. (AFLCR 400-15) (17:401)

Of the four definitions, the first two are quite lengthy and somewhat similar. However, the second has a broader scope and includes several facets, such as commercial and industrial activities, not included in the first discussion. It is interesting to note the last two definitions are both used within Air Force Logistics Command (AFLC). These four definitions are all used by agencies of the U.S. government.

The above four definitions at least all approach the subject from a military point of view. There is, however, at least one contrasting "civilian" definition of logistics. The preface to the Transportation - Logistics Dictionary describes logistics as a new management planning area, combining distribution management and materials management (47:V) The formal definition within the dictionary includes "the management of all inbound and outbound materials, parts, supplies, and finished goods. . . . the integrated management of purchasing,

transportation, and storage on a functional basis (47:195)." This definition connotes an approach to logistics from a manufacturing point of view, and the prefatory statement about logistics as a "new" management planning area indicates a lack of appreciation of the parallels between military and civilian logistics.

In contrast to these specialized dictionaries, The Random House College Dictionary defines logistics as "the branch of military science dealing with the procurement, maintenance, and movement of equipment, supplies, and personnel (46:787)."

From the above survey of three formal sources, six separate definitions were obtained. A fourth formal source, AFM 2-18 (final draft version by LTC Richard V. Badalamente), uses exactly the same JCS Pub 1 definition as the first definition in the Compendium (7:2-5).

To add to the inherent confusion of multiple formal definitions, authors writing about logistics topics tend to synthesize their own personal concepts of logistics into summary definitions. To illustrate this last point, it is interesting to analyze three works by Rear Admiral Henry E. Eccles, USN retired, a foremost authority on logistics. The following definitions were extracted from works written in 1950, 1959, and 1982, and they illustrate the evolution of Eccles' thinking. In 1950, he defined logistics as the "provision of means of war (25:7)." In 1959, he quoted Duncan Ballantine's definition: "As the link between the

war front and the home front the logistic process is at once the military element in the nation's economy and the economic element in its military operations (22:5)." He then supplied his own: "Logistics is the provision of the physical means by which power is exercised by organized forces (22:22)." His 1982 definition said "logistics provides the means for the conduct of military operations (23:11)." Two common elements provide the thread of continuity through all three works. First, he emphasizes the coequal relationship between strategy, tactics, and logistics (22:9; 23:10; 25:5), and second, the idea of logistics as the link between the civilian economy and military force is everpresent (22:5,17-18; 23:11; 25:11). The evolution of Eccles' thinking on the subject can be traced because he has written so prolifically on it. With other writers, only single definitions are available.

Three such writers are R.G. Ruppenthal, Martin Van Creveld, and James A. Huston. Ruppenthal discusses the definition of logistics only in an introductory note, and limits the use of the term to include supplying armies in the field and moving troops to the combat zone (43:viii). Van Creveld's ideas are very similar in that he defines logistics as "the practical art of moving armies and keeping them supplied (61:1)." Huston, on the other hand, summarizes a more extensive discussion of the evolution of the term with a simple phrase "the application of time and space factors to war (32:vii,viii,692)."

As can be seen, the definitions of the term "logistics" are many and varied. From the ten sources consulted for this brief review, there were at least ten separate definitions, with varying degrees of similarity and difference. To deal with this variation, the following synthesized definition will be made for the purposes of this paper:

logistics - the practical art of linking civilian production to military requirements in order that the capability to achieve national objectives be created.

Scope of Research

This research effort directly continues the work of Captains Stanley Collins and Charles Carpenter. Their effort was initially directed toward developing a course in logistics history for the School of Systems and Logistics, but they found there was such an extensive amount of material that their original objective could not be achieved in the allotted time. Consequently, they redirected their efforts toward an extensive review of the literature available and toward determination of the topics which should be included in such a course. The reader should consult their research report, Air Force Logistics: A Historical Perspective (1940 to 1983), AFIT thesis number LSSR 3-83, for any necessary background information.

Since this effort will be based almost entirely upon

their work, much background research and justification which might ordinarily be expected for a paper of this nature has been eliminated. Including an extensive amount of background material and justification would be a needless duplication of effort. Consequently, this research will be directed toward answering the following questions.

Research Questions

1. What form should a course in logistics history take?
2. What time period should the course cover?
3. What topics should be covered?
4. How should the topics be divided among the lessons?
5. Should the lessons be time oriented or topic oriented?

II. Methodology

Because this paper is not a standard research effort, the methodology for answering the research questions will, of necessity, be somewhat unusual. In fact, there is no standard methodology for designing an academic course. It would serve no purpose to delve into academic theory since any potential instructor will adapt the course materials presented herein to his or her personal teaching techniques. Although instructional system development is used elsewhere within Air University and throughout the Air Training Command, the faculty of the AFIT School of Systems and Logistics has received no specific or general guidelines for course development.

The following approach will, therefore, be used in designing this course in Air Force logistics history. The topics identified by Collins and Carpenter will be used as a basis for the topics to be taught in the course. The approximately 450 bibliographical references which they identified will be used to design lesson plans, identify sources for lecture materials, and provide student reading assignments. The objective is to provide a completely useable collection of course materials for a one quarter, graduate level course in Air Force logistics history to a potential instructor, to include lesson plans, lecture outlines, a student syllabus, and student reading

assignments. The student syllabus will be Appendix A to this report, and the lesson plans will be Appendix B.

III. Recommendations

The recommendations to be made following this research effort can be divided into two categories, those which pertain directly to the administration of the course, and those which are more general in nature. The following actions are recommended regarding the administration of this course in logistics history.

1. Recommend this course be incorporated into the School of System and Logistics curriculum and be offered as an elective as soon as possible.

2. Recommend serious consideration be given to establishing this course as a requirement for all students.

3. Recommend that the grading of the course be on a contract basis.

4. Recommend students be encouraged to pursue their own study of logistics history.

5. Recommend the focus of instruction within the course be on lessons learned.

The following more general recommendations are offered for consideration.

1. Recommend serious consideration be given to establishing a similar course in general Air Force history.

2. Recommend students be given at least a small selection of historically oriented courses from which to

choose to enhance their graduate studies.

3. Given that logistics forms a coequal triumvirate with strategy and tactics, recommend that students be given an overview course in strategic and tactical sciences.

Appendix A: Syllabus Of Instruction

I. COURSE

- A. Title: Air Force Logistics Since 1940
- B. Number:
- C. Quarter Hours: 3, graduate level

II. COURSE DESCRIPTION

This course provides a basic knowledge and comprehension of Air Force logistics history since 1940, including wars and conflicts during this time period and between war activities, with an emphasis on lessons learned. Topics addressed include support of wartime campaigns and between war activities with a focus on requirements determination, acquisition, distribution, and conservation.

III. COURSE OBJECTIVES

The basic objective of this course is to provide future military and civil service decision makers with a basic knowledge and comprehension of Air Force logistics history so as to provide a background for future decision making. Upon completion of the course, the students should:

A. Be able to justify the study of military history in general, and Air Force logistics history in particular.

B. Know that strategy, tactics, and logistics form a co-equal triumvirate of military considerations.

C. Comprehend the relationship between given wartime campaigns and the logistics activities which supported them.

D. Comprehend the limitations on those wartime campaigns caused by logistics considerations.

E. Be familiar with selected trends in the development of the Air Force Logistics Command, and related Air Force logistics activities.

IV. GENERAL COURSE INFORMATION

Required readings should be completed prior to class. Preparation is crucial to meaningful student participation and proper understanding.

V. SCHEDULE

Lesson 1: Course administration and introduction.

Lesson 2: Overview of AF logistics history before WW II and beginning WW II.

Lesson 3: WW II.

Lesson 4: WW II.

Lesson 5: WW II.

Lesson 6: Between WW II and Korea
Lesson 7: Berlin airlift.
Lesson 8: Berlin airlift.
Lesson 9: Korean War.
Lesson 10: Korean War.
Lesson 11: Mid-term examination.
Lesson 12: Between Korea and Vietnam.
Lesson 13: Between Korea and Vietnam.
Lesson 14: Vietnam War.
Lesson 15: Vietnam War.
Lesson 16: Vietnam War.
Lesson 17: Post-Vietnam.
Lesson 18: Post-Vietnam.
Lesson 19: Post-Vietnam.
Lesson 20: Course critique and final review.

Appendix B: Lesson Plans

LESSON 1

TITLE OF LESSON: Course administration and introduction

METHOD OF PRESENTATION: Lecture

STUDENT PREPARATION: None

PLAN OF PRESENTATION:

-Course administration

--Go over syllabus

---Insure students have course materials and know when course meets

---Insure students understand grading policies and course requirements

-Introduction

--Scope and organization of course

---Organized chronologically, from 1940 through relatively recent history

---Obviously cannot cover everything that happened in the field of logistics in that time period in one quarter

---Topics were subjectively chosen based upon degree of interest and relevance to present

---Focus of study of periods of war will be on direct support of combat efforts

--Why study history (several quotes will serve to stimulate the instructor's discussion of this topic)

---"professional study of any field involves, in part,

acquiring a sense of the historical development of the field. This allows you to place yourself at some point in time in the development of major ideas and practices. . . . you benefit from many years of . . . thought and practice. A sense of history about the field . . . is one of the factors that distinguishes a professional approach from a purely vocational approach (4:518)."

---"When a Chief of the Imperial General Staff wrote that 'he had never had time to study the details of military history' . . . it was as if the President of the Royal College of Surgeons said he had never had time to study anatomy, or do any dissection. (R.H. Liddell Hart) (16:32)"

---Historical trends help explain present circumstances and show where projections will lead unless elements change or have changed (16:37)

---"The history of war is full of the disastrous consequences of taking things for granted and of refusing to learn from past experience (26:23)."

---Kennedy sought to avoid backing into war during Cuban missile crisis after reading how WW I started when no one would back down - consciously left Khrushchev avenue of graceful retreat (16:43)

---"More than most professions, the military is forced to depend on intelligent interpretation of the past for signposts charting the future. Devoid of opportunity, in peace, for self-instruction through actual practice in his profession, the soldier makes maximum use of the historical record in assuring the readiness of himself and his command to function efficiently in emergency. The facts derived from historical analysis, he applies to conditions of the present and the proximate future, thus developing synthesis of appropriate method, organization, and doctrine. Gen Douglas MacArthur (21:Backcover)"

--Why logistics history

---"all commanders must have a sound general knowledge and appreciation of logistics. No airman can be qualified for high command, even in a combat organization, who does not know the requirements and capabilities of his materiel. (3:i)"

---"elements of logistics run through all military operations from the time of the first thought of war until the bombs are dropped on the enemy (3:ii)."

- As important for logisticians to study history as other military specialities
- Logistics history one of most neglected topics in military literature
- Logistics history "is so often ignored by military historians. The result is that . . . armies frequently seem capable of moving in any direction at almost any speed and to almost any distance once their commanders have made up their minds to do so. (61:2)"
- For example, much attention paid to Napoleon's strategy and tactics, but no detailed analyses of his logistics (61:2)
- "Too often . . . Great armies appear, full blown, from nowhere, do battle, then disappear (32:ix)."
- "It is a function of military history to provide rich experience out of which imaginative leaders will create new methods to meet new situations. Today, as a basis for decisions of public policy and military action, civilians as well as the military require some experience in military logistics. (32:ix)"
- Use of term
 - Logistics - from Greek logistikos meaning "skilled in calculating"
 - First used in Roman and Byzantine times for an administrative official with title "Logista" - apparently implied skill in mathematical computations (32:692)
 - 1838 Antoine Henri Jomini: theory of war based on strategy, grand tactics, logistics - coequal triumvirate (34:3)
 - Term into use before WW I, but only into common reference since shortly before WW II (32:viii)
 - Many definitions (see appropriate section, Chapter 1, this thesis)

LESSONS 2, 3, 4, & 5

TITLE OF LESSON: Early Air Force Logistics and World War II

METHOD OF PRESENTATION: Lecture, Guided discussion

STUDENT PREPARATION: Read

PLAN OF PRESENTATION:

-AF logistics history before 1940 (brief outline)

--Before and even including WW I, logistics support of flying activities small and uncomplicated

---Logistics control centered under Signal Corps, then War Department Army Aviation, then Army Air Service

--Authority decentralized 1918

---4 Dec 17, Signal Corps Equipment Division established Airplane Engineering Department

---Army Aviation changed to Army Air Service 27 Aug 18, department changed to Airplane Engineering Division, directly under Chief, Army Air Service

----Controlled labs and test facilities

--Supply and maintenance not decentralized until Jul 1921

---Aviation general depots established during WW I

----Controlled from Supply Division in Washington

----Jul 1921 moved control to Wilbur Wright Field (Dayton)

----Renamed Property, Maintenance, and Cost Compilation Section

----Renamed Field Services Section 26 Jan 24

----Supervised supply and maintenance activities of continental air intermediate depots (5:1-3)

--Materiel Division established Oct 1926 McCook Field (Dayton,

Ohio)

---Consolidated functions performed previously by Engineering, Supply, and Industrial War Plans Divisions and Materiel Disposal Section

---1927 personnel strengths: 72 officers, 2 warrant officers, 8 enlisted men, 921 civilians

---Jurisdiction over

----Experimentation and research

----Procurement and production

----Storage, issue, and maintenance

----Salvage and disposal

----Industrial war plans

---Supervision of all depots, plants, district offices, and personnel engaged in above activities

---Appropriation allotted to division in 1927: \$14,073,050.17

----Experimental and research work: 15%

----Purchase of new airplanes and equipment: 55%

----Normal operating expenses, ground equipment, and runways: 13%

---By 1939, appropriation was \$79,329,626, allocated as follows

----Purchase of new aircraft: 44%

----Experimental research and service test: 4.5%

----Maintenance and operation of airplanes, depots, and stations: 43%

----Related activities of National Guard and Organized Reserves: 8% (37:1, 3-5)

-World War II, European Theater of Operations

--Germans invaded Poland 1 Sep 39, Britain and France declared war 3 Sep

- US closely observed events - isolationist movement, but many people sure we would be unable to remain neutral
- Sent more military observers to foreign embassies in 1940
- Maj Gen James E. Chaney (Air Corps) to England Oct 40 to study air battles
 - At this time, Britain alone - Denmark, France, Norway, Netherlands, and Belgium overrun
 - Chaney submitted report in Dec 40 - Luftwaffe overrated, Britain would not be defeated
- 11 Mar 41: Lend Lease Act passed by Congress; \$7 billion to provide war materials to allies (Britain), i.e. logistics support (43:13)
- 29 Jan 41: initiation of American-British Staff Conversations (ABC-1) [Chief of Staff, US Army; Chief of Naval Operations; British Chiefs of Staff]
 - Establish principles of joint operations and determine best method of acting jointly against Axis in eventuality of US entry
 - No official sanction by Roosevelt, no formal commitments - US neutral
 - Provisions of ABC-1:
 - Agreed to collaborate continuously in planning
 - Joint planning staffs in both capitals
 - "Europe first" as opposed to Japan
 - Formally specified naval, land, and air tasks and listed forces each country to provide
- US mission to London
 - Called Special Observer Group (SPOBS) in interests of neutrality
 - Maj Gen Chaney (Special Army Observer), Brig Gen Joseph T. McNarney (Chief of Staff)
 - 18 officers, 11 enlisted men (43:14)
- SPOBS

- Establish liaison with British, exchange information, learn their equipment and methods of operation
- Dressed in civilian clothes and assigned to embassy, but mission clearly to be ready to activate US military mission to Britain if/when US entered war (43:16-17)
- "make whatever plans and achieve whatever cooperation they found necessary to insure a smooth and rapid transition from peace to war in the event that the United States entered the conflict (43 :16)."
- Establishing an air force in the U.K.
 - ABC-1 called for air offensive if US entered war
 - Plans for shipping 32 bombardment and pursuit squadrons
 - Approximately 32000 men, offensive mission against continent
 - Air force build-up and preparation for offensive operations of highest importance 1941, early 42
 - Fall 41, 8 airfields under construction 65 miles north of London chosen for use by first US bomber units (43:26-27)
- Chaney's command and organization proposals, Sep 41
 - Area commands (air and ground) for southern England, Scotland, and Northern Ireland; bomber command; and base command for supply services in England and Scotland
 - Lt Gen Arnold (AAC) suggested separate major commands for ground and air
 - Arnold eventually won - each theater eventually had separate air, ground, and service commands (43:27-28)
- 7 Dec 41, Japanese attack Pearl Harbor, US enters war
- HQ 8AF activated late Jan 42, Brig Gen Ira C. Eaker commander
 - Bomber, fighter, and service commands
 - 2 May, Maj Gen Carl Spaatz named commander 8AF (43:28)
- Roosevelt announced production targets early Jan 42

- Aircraft: 60000 in 42
120000 in 43
- Tanks: 45000 in 42
75000 in 43
- New merchant shipping: 8 million tons in 42, 10 million in 43 (had been only 1 million in 41) (65:170)
- Jan plans called for dispatch of 4748 planes to UK (3328 bombers)
- Figures reduced in following months
- No planes or personnel movements on time due to shipping shortages and movement of planes to Pacific
- First 8AF troops arrived 11 May
- Plane deliveries dependent on ability to ferry via North Atlantic route
- Ferrying Command (later Air Transport Command) established May 41, but little experience or facilities for large-scale movements
- Had relied on British for meteorology and some servicing
- First plane of 8AF (B-17) reached UK 1 Jul 42 - from Presque Isle, Maine to Goose Bay, Labrador to Greenland to Iceland to Prestwick, Scotland (43:29)
- 20 Mar 42, Eaker's plan to solve problems necessary to start bombing operations
- Ideal method to insure maximum efficiency and continuity would require substantial buildup
 - Independent supply and maintenance system before starting operations
 - Result: delay in US participation in bomber offensive
- Alternative: commit bomber groups as available, from eight airfields already ready
 - Use British depots, repair facilities, intelligence, and hospitals
 - Result: heavy dependence on British, supply limitations

- "hand-to-mouth," earlier entry of US forces
- This one recommended by Eaker
- May 42 agreement with British for transfer or construction of 127 airfields
- Shortage of labor and materials
- Maintenance depot to be established at Langford Lodge near Belfast, open Sep 42
 - Manned by civilians (Lockheed)
 - Eventually military, after training
- Second depot at Warton near Liverpool, open Jun 43
 - For repair of bombers and engines
 - Approximately 4000 men
- Burtonwood interim depot until others opened
 - Operated jointly with British then transferred to US (43:30-31)
- 19 May 42, HQ Detachment, 8AF, Gen Eaker assumed command all US air units in UK
- 18 Jun, Gen Spaatz assumed command 8AF
- Any US participation in offensive operations due to British assistance (43:31)
- Services of Supply (SOS) established as separate major command for logistics, but:
 - Air Force Service Command established by War Dept too (increasing AAF autonomy)
 - Air Service Command part of 8AF in May-Jun 42
 - Divided supply functions: Air Service Command responsible for supplies peculiar to air forces, SOS all construction and supplies common to air and ground
 - Contrast continual push for AAF autonomy at this time (WW II) with push in 50s and 60s toward single manager concept and services relying on each other

- Continuing controversy, decisions delayed by more pressing matters, AAF continual reach for autonomy (43:38-39)
- Air Force logistics planning eventually settled on following requirements (Jul 42):
 - 98 airfields
 - 4 million square feet storage space
 - 3 repair depots
 - 26 headquarters installations
 - Accommodations for 240,000 men (43:73)
- 12AF activated for Operation Torch (North Africa)
 - Had first priority on everything
 - Units transferred from 8AF
 - 8AF lost 27,000 men and served as replacement depot for several months
 - Also lost 1100 planes and 75% of supply stocks to 12th
 - Severely impacted bombing operations against continent
 - Gen Spaatz named commander 12th (43:100-101)
- ***See p. 100 for table of troop build-up by month Jan 42-Feb 43; p. 129 for all 1943
- Torch valuable experience for Overlord
- Troop build-up in Britain almost halted by Torch requirements and uncertainty following Torch and decision to invade Sicily
- Trident Conference (Allied leaders) May 43, three major decisions
 - Enlarge US-British bomber offensive from UK
 - Exploit Sicily operation to eliminate Italy from war
 - Target date for cross-channel invasion 1 May 44 - build up forces and equipment to achieve
- Losses to U-boats declining + new construction = net gains in available tonnage

- Positive impact on build-up (ruppl:121)
- Early 1943, little recovery among air forces from Torch impact, in spite of high priority
 - In Apr, 8AF only operating six heavy bomber groups, average strength 153 planes daily
 - Increased urgency finally felt in May, almost entire shipment to UK was air force (20,000 men)
 - From May through Aug, air force shipments almost three fifths of total
 - May - 16 groups, 1420 planes, 74,000 men
 - Dec - 46 groups, 4618 planes, 286,264 men
- Acute shortages in engineering troops for construction (of all types - including airdromes)
 - Summer 43 War Dept diverted partially trained air force and ground troops for training as service troops
 - Airdrome standards already below RAF standards
 - Serious imbalance combat:service troop ratio
 - Oct 43, 8AF shipped thousands of "casuals" for OJT in UK as service troops (43:130-132)
- ***See p. 135 for table of cargo shipments to UK in 43
- Continued conflict between SOS and 8AF Service Command
 - Summer 42 agreed SOS handle supplies common to air and ground, service command handle supplies peculiar to air force - requisitioned directly from US (Zone of Interior - ZI)
 - SOS controlled construction of airdromes and aviation engineer construction battalions, and local purchase - against air force wishes
 - Air Service Command actually wanted independent supply line to ZI
 - Said SOS too slow and required too many justifications for air force requisitions

- SOS made concessions in requisitioning procedures
- Air force wanted certain common items shipped in bulk without detailed justification - SOS refused
- Separate supply line consistently opposed by theater big-wigs (43:170-171)
- After Torch, realized necessity of separating strategic and tactical air forces
 - In preparation for Overlord, 9AF transferred from Middle East
 - 8AF strategic; 9AF tactical; both had service commands
- By Jan 43, principle of Supreme Allied Commander agreed upon
 - Three major commands under: Allied Expeditionary Air Force (AEAF) (tactical); 21 Army Group; and Allied Naval Expeditionary Force
 - Air Marshall Sir Trafford Leigh-Mallory commander AEAF - all tactical air forces supporting invasion (RAF Tactical Command and US 9AF)
- Dec 43, Cairo-Tehran Conferences named Gen Eisenhower SACEUR, headquarters designated SHAEF
- By Jan 44, reorganization of air forces
 - US Strategic Air Forces (USSTAF) formed
 - 8AF in England (Doolittle)
 - 15AF in Mediterranean (Twining)
 - Spaatz commanded USSTAF
 - Two deputies under USSTAF
 - Operations, and administration and logistics (took place of 8AF Service Command - called USSTAF Air Service Command)
- Apr 44, SHEAF obtained control of strategic bombing to coordinate with ground operations in Overlord (43:192-193, 195, 203)

**See p. 232 for table of troop build-ups Aug 43-May 44

**See p. 237 for table of cargo flow to UK Nov 43-Jul 44

--Heavy bomber airfields

---Average cost \$4 million

---400,000 square feet covered accommodations each

---Runways equalled 20 miles concrete road 20 feet wide each

---B-17s and B-24s excessive strain on British six inch concrete runways

----Had to add eight more inches of concrete or resurface with other materials

----So much deterioration that approximately 25% of total labor employed was on maintenance

--By May 44, air force program had met final stabilized plans of Nov 43

---126 airfields

---6 air base depots

---11 ordnance depots

---11 ammunition depots

---Total closed storage and shop space over 10 million square feet

---Accommodations for 442,000 troops

---Rough cost \$440,000,000

---Greatest limiting factor: lack of materials and manpower (43:251, 253)

--Rations

---Initially relied on British, unpopular

----Too much tea, bread, potatoes, and mutton

----Not enough sugar, beef, coffee, fruits, and vegetables

---Improved by buying vegetables from British and even planted crops around camps

- 7000 acres in 42, 14000 in 43
- US units baked white bread from wheat shipped from US - British using National Wheatmeal Flour (wheat, barley, oats); to preclude jealousy, US adopted wheatmeal
- US procured many items from British as part of reciprocal aid program
 - 1,120,000 measurement tons from Jun-Dec 42 alone: 600,000 tons quartermaster items; 1,450,000 square yards portable airfield runways; 15,000 bombs; 70,000 rounds artillery ammunition; several million rounds small arms ammunition; 250,000 anti-tank mines; 500,000 hand grenades; 1000 parachutes; several hundred thousand camouflage nets; plus
 - Problems with terminology
 - Driving on left side of road
 - Pounds, shillings, and pence
 - Petrol vs. gas
 - Lorries vs. trucks
 - Lifts vs. elevators
 - Calorifier vs. hot water boiler
 - Dustbin vs. garbage can
 - Tingles vs. shoe tacks
 - Hessian vs. Burlap
 - Butter muslin vs. cheese cloth
 - Tropical vest vs. summer undershirt
 - Initial attempts at strict bookkeeping and accounting abandoned - virtually impossible, settled for trying to keep an accurate count of items
 - Early on, air force was chief procurer of British supplies
 - Jun 42-Jul 43 air force drew 49% of all supplies and equipment from British
 - Replacement parts, hand tools, photo and communications equipment, flying clothing, parachutes, and Spitfires

---By Spring 44

----1100 planes; several hundred gliders; 32,000 bombs;
7000 sets of armor plate for heavy bombers; 43,000
jettisonable gas tanks; 44,500,000 yards Sommerfeld
track; 50 mobile repair shops for crash-landed bombers;
heated winter flying gear; radio equipment; etc.
(43:255, 257)

***See p. 258 if want summary of British aid through Jun 44

--D-Day, 6 Jun 44, continent invaded

---Additional burdens for air force logisticians

----Support of ground units

----Support of tactical air units as moved forward

--Some supply flexibility provided for invasion by air delivery

---Semiautomatic delivery set up in advance for the two
airborne divisions

---Pre-stocked parachute packed supplies for delivery to
isolated units

---Could deliver 6000 pounds/day within 48 hours of request
after airfields available

--Special express supply shipments

---Ten emergency air shipments in first 11 days

---Approximately 13 air shipments of ammunition in first month

---Approximately 6600 tons flown into beachheads in Jun and
Jul - especially during and right after storm which
destroyed artificial harbors (43:309-310, 448)

--Supply by air during pursuit

---Advantages

----Speed and freedom of movement

---Disadvantages

----Low capacity (tonnage and volume)

- Uncertain availability of aircraft
- Inadequate ground facilities at source and destination
- Enemy activity
- Weather
- Costly
- Regulations specified only used for emergencies, airborne units, and units cut off from normal resupply
- Combined Air Transport Operations Room (CATOR) established as special staff section of AEA
- Control all air transport allocated for supply and evacuation, except airborne units
- First resupply by air scheduled during Overlord for airborne units in Cotentin peninsula; difficulties
 - 64 of 208 aircraft scheduled for 82nd Airborne on D+1 forced to turn back - weather
 - Of the 250 tons dispatched, 155 was dropped, 90% of which was recovered by troops; therefore, approximately 56% dispatched actually reached troops
 - 101st Airborne supplies "on call" basis: reconnaissance aircraft misread ground panels - 118 planeloads supplies dispatched which division did not need and wasn't ready to receive
 - Other on call missions successful - parachute and glider (usually 105 mm howitzers and heavy machine guns)
- 8 Jun, 15 lbs ether dropped to field hospital near Carentan
- Food and water dropped to AA unit isolated on Iles St Marcouf off Utah beach during storm two weeks later
- Early Aug, emergency drop to infantry battalion cut off by counterattack
 - 10 Aug, 12 aircraft dropped food, ammunition, medical supplies
 - 11 Aug, less than half of 25 aircraft dispatched were successful - poor visibility

- Emergency landing strips beachhead area
 - 1400 tons (mostly ammunition) 18-24 Jun (storm)
 - By end Jul, 7000 tons delivered by IX Troop Carrier Command
 - By end Jul, 20,000 troops (almost one fifth of total) casualties evacuated to UK by air
- Ground units liked air service - warned about false "emergencies"
- Increase airfreight capability
 - Mid-Jun SHAEF directed AEF prepare plans to increase capacity to 1500 tons/day by D+30-35 and 3000 tons/day by D+45
 - Main limitation was landing fields
 - Plans approved and initiated
 - Half of 3000 was in British sector, half in American
 - Average landing strip assumed to handle 500 tons/day; 3 strips each sector; 1500 tons required 600 C-47 sorties
- Breakout at Avranches led to study of air supply of advance to Seine
 - At beginning Aug, still had only one field, and system tested only to 500 tons/day
 - If could deliver 1000 tons/day, could cross Seine quicker and support two extra divisions
- The tyranny of logistics
 - 15 Aug, SHAEF approved expansion of air deliveries to 2000 tons/day for 10 days
 - 3rd Army already near Seine and desperately short of supplies, especially gasoline
 - Expanded deliveries did not start until 19 Aug, and then only averaged 600 tons/day
 - 3rd Army crossed Seine 20 Aug, operating with less than one day's reserve of rations and gas - asked for ten

day extension on expanded airlift

- SHAEF approved although would hamper training of First Allied Airborne Army
- Tyranny: needed engineer materials to rebuild captured fields and build new ones; had to use airlift to get it to continent; not enough space at tactical forces air fields to have supply operations co-located; shortage of trucks in UK hampered loading planes
- Paris captured ahead of schedule added civilian mouths to feed
- Airborne armies needed planes back for operational training (Market-Garden coming up)
- Called on strategic forces: Gen Spaatz ordered to use all available C-47s from service commands and convert 100 B-17s or B-24s for cargo use
- Disadvantages to using bombers: airfields had to be bigger and better, longer load and unload times, considerable modification to carry gasoline
- Various combinations of bombers, transports, and airborne army C-47s throughout Sep; trade-offs between supplying Paris and gasoline to front
- ****See p. 581 for chart of air transported cargo
- Airlift effort fell short
 - Inexperience and inadequate planning
 - Administrative difficulties
 - Lack of landing fields
 - Requisitioning process too cumbersome
 - Lack of coordination at loading fields
 - Lack of coordination at receiving fields
 - Competition for available aircraft (43:572-583)
- Overall transportation shortage made continuation and expansion of air supply highly desirable by armies
- COMZ unable to meet daily maintenance requirements of

- all forces by rail and road beginning Oct
- Additionally, needed 150,000 tons to rebuild 7-day supply reserve
- Air could not meet shortage but Army Group G-4 asked for maximum possible allocation
- SHAEF Air Priorities Board refused: extravagant and uneconomical
 - Bombers completely withdrawn
 - Air supply only by IX Troop Carrier Command (US) and 46 Group (British)
 - Reduced plane allocation immediately, limited use to emergencies (as originally intended)
- Two and one half months - 675 tons/day: weather, lack of forward fields
- Early Dec, further reductions: to 150 for IX and 40 for 46 Group
- German breakthrough in Ardennes (Battle of Bulge)
 - 23-27 Dec, 850 sorties to Bastogne: air drop supplies to surrounded 101st Airborne; 61 glider sorties; estimated 95% effectiveness
 - Attempt to air supply 3rd Armored Div in Belgium: 23 of 29 aircraft dropped supplies to enemy on 23 Dec; 24 Dec bad weather cancelled drops
 - Overall, good performance but lack of preparation
- After emergency, COMZ prepared "bricks" of supplies to use in future
 - Basic brick: for airborne division, 270.5 tons, could add 76 mm gun and 155 mm howitzer ammunition for infantry and armored divisions; one packed for regimental combat team (1 day of supply/div)
 - 16 bricks prepared, UK and continental airfields (44:161-165)
- Manpower shortages, especially infantry
 - 1 Jan 45, USSTAF ordered to transfer 10000 noncombatants

for retraining

---Policy: all physically qualified white enlisted men under age 31 assigned to noncombat units eligible to be retrained as infantrymen, except key specialists; while keeping units at minimum operating strengths (43:329)

--Air transport in the final push

---Contributed notably toward maintaining momentum of final offensive spring 45, much better than in 44; 2 reasons

----Continental airfields plentiful - no competition for use

----No withdrawals of airlift for airborne operations

---Low ebb after Ardennes, Feb and Mar 45 - 25 sorties/day, approximately 55 tons/day, almost all medical supplies

---Still limited by SHAEF to emergency requests

---By end Mar, SHAEF authorized maximum airlift to support operations beyond Rhine

---30 Mar, IX Troop Carrier Command (TCC) delivered 197,400 gallons gas to Patton, 329 planes

---Still had administrative problems with lift - example: CATOR authorized deliveries without notifying 3rd Army; no one to unload planes

---Second week Apr, peak deliveries, over 6200 sorties and 15000 tons (80% gas); mostly to 1st and 3rd Armies

---3rd Army (Patton) had unique plan/arrangement with CATOR for air supply

----2nd Engineer Aviation Brigade followed advancing infantry and armor very closely; aviation engineers attached to each corps

----Captured fields were repaired immediately, checked by IX TAC, and used - 3rd Army used 30 fields alone, sometimes only a few days as army advanced

----"Flying supply points" directly behind fighting front - could issue supplies directly to users

---3rd Army eventually had most extended supply lines (Austria and Czechoslovakia) - received most airlift

- 30 Mar-8 May, 27,000 tons by air (over half of all air tonnage)
- 22,500 tons gas (6 million gallons) - 22% of all gas issued to 3rd
- Average 50,000 rations/day
- Small amounts Class II and IV supplies (field wire, cable, batteries, wheels and tires)
- SHAEF continued to refuse to allocate specific numbers of planes to specific forces, or even specific numbers to overall airlift - uncertainty
- IX TCC averaged 650 sorties, 1600 tons/day throughout Apr 45
 - Greatest value in gasoline transport and responsiveness to demand
- Secondary airlift role - casualty evacuation
 - Approximately 40000 removed in Apr
 - Also Allied POWs, 135,000 from 3rd Army alone (44:424-427)
- 21 Apr, conversion training ordered stopped by end of month
 - Original plan, air forces to give up 32,920 men 1 Feb-14 May; 10,500 15 May-15 Jun
 - Original casualty estimates much higher than actual casualties experienced
- Air force used retraining program to get rid of misfits (only requirements were age and physical fitness)
 - Survey of a forward battalion of 1st Army in early Apr - of 514 men from air force, total of 231 court-martial convictions
 - Approximately 22% of total air force releases had prior convictions
 - USSTAF said resulted from "undue haste, overzealous and faulty administration" and promised not to let happen again - program ended (44:461, 468-469)

-World War II, Pacific Theater of Operations

--Because of Europe first policy, PTO was often required to
"make do"

--As US entered war, available supplies went to England fighting
to hold out against U-boat blockade

--Main concern in Pacific was holding Australia and maintaining
island chain to her from Hawaii

--Important to keep command arrangements and vastness of theater
in mind

--Air units southwest Pacific as of 31 Jun 42, 1602 officers,
18116 enlisted

---On paper

----2 heavy bomb groups, 2 medium bomb groups, 1 light bomb
group

----3 fighter groups

----2 transport squadrons

----1 photo squadron

---Actually

----43rd Bomb Gp (H) not ready until fall - 19th Gp carried
load

----38th Bomb Gp (M) B-25s not mission capable until
mid-Sep

----22nd Bomb Gp (M) B-26s in operation since Apr

----3rd Bomb Gp (L) absorbed elements of 27th Gp after Java
fell; 22 A-24s, 38 A-20s, and 17 B-25s

----All three fighter groups reported 100% manned with 50%
reserve by 1 May

----Jul, two squadrons of 35th Fighter Gp moved to Port
Moresby (P-40s)

----8th Fighter Gp, P-39s in Australia

----49th Fighter Gp, P-40s defense of Darwin

- All bomber groups used Port Moresby as staging point, flying from Australian bases: B-17s based at Townsville flew 36-48 hour missions (18 hours actual flight time) - including possibility of enemy strikes while at Moresby
- Conditions at northern Australian bases
 - Remote, no population centers near
 - Primitive living conditions
 - No recreation
 - Rations different from that which accustomed to
 - Some of men had been rescued from Philippines and Java - tired
 - Recent arrivals inexperienced and poorly trained
 - Promotions very slow
 - Hospital facilities inadequate
 - All added up to poor morale (18:7-8)
- US Army Air Services, Maj Gen Lincoln
 - 7500 mile supply line from US, premium shipping space (everybody needed everything), ETO often had precedence
 - Planes flying South Pacific ferry route often cannibalized at enroute island stations
 - Australian industry and transport inadequate
 - Usually no more than 50% operationally ready rate: spare parts shortages, inexperienced and poorly trained mechanics, few service units, poor landing fields, bad weather, distances, constant combat (18:8-9)
- Command arrangements in PTO (vast distances combined with interservice politics)
 - Southwest Pacific Area - MacArthur (roughly, Australia and nearby area)
 - Pacific Ocean Area - Nimitz (roughly, Hawaii and islands arcing westward; boundary between MacArthur and Nimitz kept shifting)

- Further divided into North, Central, and South Pacific
(South responsible for defending island chain from
Hawaii to Australia)
- Dispute between Army and Navy over best defense of island
chain (map p. 12)
 - Navy: establish series of bases, defend each with
substantial air strength, including heavy bombers
 - AAF: bombers in short supply and designed for offensive
use; put major mobile striking forces at each end of chain
 - Controversy continued and was not settled for months
 - Battle of Coral Sea (8 May 42) used by both sides to
support argument
- 9 May 42, Gen Arnold outlined plans for air strength to be
achieved by 1 Jul, without interfering with build-up in
England
 - 25 fighters for Christmas Island, 25 for Canton and Fiji,
50 each for Tongatabu and New Caledonia, 80 heavy bombers
each for Australia and Hawaii (18:10, 13-18, 19)
- Solomons: 7 Aug, Marines invaded Guadalcanal; AAF contributed
mainly by reconnaissance in prior two months
- Battle for Guadalcanal, 11th Bomber Group, B-17s based on
Espiritu Santo primary search mission over lower Solomons (map
p.39) - prevent surprises on Guadalcanal
- Primitive conditions on Espiritu Santo
 - Crews slept under trees or wings. or in planes
 - Little or no service people - crews performed own
maintenance
 - No spare parts
 - No equipment to handle or refuel planes
 - No dock, roads (one foot of soft black dirt + tropical
rain), or unloading facilities
 - No supply control - thousands of boxes and crates stacked
under trees without identification

- Fuel was most critical - no tank trucks, pipelines, or bulk storage
- Steel drums of gas dumped overboard cargo ships, towed in nets to shore, manhandled into dispersed dumps under trees
- Drums loaded onto trucks, rolled onto a stand, poured into tank wagons which then serviced planes
- One B-17 used 50 drums per mission
- Ex: 6 Aug, all hands (including commanding general) worked 20 straight hours to load 25000 gallons
- Strike missions often delayed because of lack of service facilities
- Endless search routine quickly wore down bombers
- AAF first detachment into Henderson Field (Guadalcanal) from 67th Fighter Sq, 14 P-400s 27 Aug
- Fly until plane and/or pilot dropped
- No servicing facilities
- Constant enemy attack
- Cooking over open fires
- Washing and bathing in Lunga River
- No changes of clothing
- Unfloored, unscreened tents, mosquitoes - malaria
- Ground crews 14-16 hour days
- P-400 also totally inadequate for air-to-air vs fighters or bombers
- Enemy bombers flew at or above 20000 feet, fighters were Zeroes
- P-400 was US export version of P-39
- No supercharger and had high pressure oxygen system
- No high pressure bottles available, so pilots couldn't go above 12000 feet

- After four days, only three of original 14 still in-commission
- Changed mission to close air support (CAS) of Marines
- Needed P-38s for air-to-air at altitude - not available until Nov
- Halsey assumed naval command (South Pacific) 20 Oct
- Guadalcanal survived Japanese attempts to recapture (18:35-36, 38, 40, 41-42, 57, 58-60)
- Organizational problems
 - Operational control of AAF planes with COMSOPAC (Navy) but air force still responsible for operational effectiveness (responsibility without authority)
 - 13 Jan 43, 13th Air Force activated, Twining commander
 - XIII Bomber Command, XIII Fighter Command
 - Still problems, but better than before (18:70-73)
- Had been no air service command in theater throughout Guadalcanal
- Twofold supply and service problem
 - Movement of supplies to theater and getting them to shore (more important)
 - What to do with stuff once on shore
- Inadequate port facilities at Noumea - not unusual to have 20-30 ships in harbor, sometimes waited three months to be unloaded
 - Espiritu Santo and Guadalcanal conditions more primitive
 - Improper scheduling: Noumea could unload 24 ships/month, properly spaced; twice as many went without regard for schedule
 - Unit weights of some cargo more than unloading cranes could handle
- Air depot group requested very early in war

- 13th Air Depot Group (ADG), and 6th and 29th Service Groups arrived Noumea 22 Nov
- Island nature required less strict adherence to unit integrity - service groups scattered over several islands
- Repairable assets stockpiled for 13th ADG: engines, accessories, tires, propellers - piled in tents, laying in open
- Engine overhaul department shops up by 15 Jan, but did not have equipment - cleaning vats but no boiler, not one single engine stand, no cylinder hones, etc.
- Some equipment in ships off Noumea, but no way of knowing where - manifests said "machinery"
- Air force shipments lacked unloading priority
- Difference in priority between planes and supporting equipment and spares
 - Ships with planes on deck docked to unload planes, then back into harbor to await proper priority time to unload equipment in holds - fighters and bombers for combat without spares
 - We sure didn't learn any lessons from this one!
- May 43, first overhauled engines finally turned out; small service detachments to Efate, Espiritu, Fiji, Guadalcanal
- By Jul, six supply stations operating
- Shortages repeated with each advance (18:74-79)
- New Guinea (SW Pacific, MacArthur)
- 5th Air Force activated 3 Sep (Kenney commanding, also commander Allied Air Forces)
 - V Bomber Command, V Fighter Command; Air Service Command, 5th AF
 - HQ at Brisbane (1000 miles from New Guinea), established 5th AF Advanced Echelon (ADVON) at Port Moresby - separate, small, highly mobile advanced headquarters for direction of combat operations
 - Strengths end of Aug: 70 B-17s, usually only 30 in-commission; 40 B-26s; 45 B-25s, 10 operational; A-20s;

- 250 fighters - 100 P-400s, rest P-39s and P-40s
- More planes scheduled for delivery but interrupted by Guadalcanal (18:98-101)
- Causes of attrition (equipment)
 - Battle damage
 - Wear and tear from rough landing fields and flying through tropical storms
 - Excessive moisture and humidity caused corrosion, especially damaging to electrical equipment
 - Tropical heat caused regular oil to lose viscosity
- Maintenance and supply
 - Salvaged skin from wrecked planes to patch large holes, used flattened tin cans for small ones
 - Saved all good ribs and bulkheads
 - Lack of bearings for Allison engines
 - Improper tools for Pratt & Whitney engines
 - Problems with P-38s: had 60 by Oct but no combat
 - Fuel tank leaks
 - Superchargers, water coolers, invertors, armament all needed major adjustment or repair
 - Did not fly until late Dec
- Air service units and facilities improperly organized
 - Main service facilities at Melbourne (2000 mi. from New Guinea)
 - Five air base groups, two depot groups - only 8th Air Base Group in New Guinea
 - Decided to concentrate facilities north of Brisbane, particularly Townsville area
 - Major air depot opened at Townsville early 43, largest outside US and England

- Early Aug tasked to construct 11 hangars for repair, 5 more for warehousing, and camp for 600 men
- Site was 1630 acres covered with trees
- 90% complete by Dec
- Additional facilities added in forward areas near Port Moresby
 - 8th Service Group had been handling all service activities
 - 27th Air Depot Group moved forward Dec 42, but had to construct own facilities
 - Seven miles from anywhere
 - Nothing but Kunai grass
 - Had only barracks bags and field packs
 - Only water in canteens and Lister bags
 - Only allotted one carpenter's kit
 - Welding, sheet-metal, machine shops - canvas over wooden frames, not enough canvas
- "Individualistic engineering" modifying aircraft
 - More guns and armor, usually successful
 - Ex: A-20 had only four .30-cal machine guns and not enough range - added four .50-cal in nose and two 450 gallon bomb bay tanks (18:101, 102-105, 106)
- More problems with men and materiel
 - Flight crews, ground crews, and other service personnel worn down by constant activity
 - No definite rotation policy
 - Diet unsatisfactory - dehydrated foods, little variety
 - Health problems: each man lost average 15-20 lbs, malaria, diarrhea
 - Many did not follow anti-malarial procedures: long pants and sleeves, repellents, sleeping under mosquito nets, taking quinine or atabrine

- Medical services heavily tasked but adequate
- Frequent rotation between Australia and New Guinea made things a little more bearable
- Needed replacements for machines as well as men
- Aircraft loss rate exceeded replacement rate for six straight months
- Many airframes and engines with excessive hours
- Kenney's requests for replacements unfilled because Torch had priority
- Service command work steadily improving
- Policy established to repair fighters in New Guinea, bombers in Australia (if flyable)
- Australian industry finally providing belly tanks, engine overhaul, propeller overhaul and blade replacement
- Townsville depot still working 24 hrs/day, seven days/week
- Winterizing equipment standard on all AAF planes, had to be removed before combat in tropics - finally got promise to be done before delivery
- Service groups still also spending time modifying aircraft
 - some of these finally done in US factories before delivery (18:150-154)
- Forces begin to build up
 - In Mar, staff had promised Kenney two more fighter groups, one each heavy, medium, and light bomb groups, one observation groups, and increases in transport fleet by summer
 - 348th Fighter Group (P-47s) and 475th Group (P-38s) arrived Jul, Aug
 - Increasing numbers B-24s and B-25s
- Continuing debate over aircraft configuration with AAF HQ: general needs and mass production vs peculiar needs of theater
 - B-25H originally planned with eight forward-firing .50-cal machine guns, planned to eliminate guns and co-pilot for cabin heater

- Rarely flew over 1000 feet in Pacific so didn't need heater
- B-25G had 75 mm cannon in nose; wanted to add four machine guns
 - Reinforced airframe at Townsville depot and added guns
 - Added 97 items, 52 of which fabricated at depot
 - 38 planes modified between 25 Sep and 8 Oct
- In spite of plane build up, still personnel shortages
 - Kenney requested two crews per plane, with 15% per month replacement
 - AAF HQ had to decide between providing replacements and turning out new units
 - Promised to meet request, except troop carrier units would only receive 7.5% replacements
 - Kenney replied, life expectancy of P-39 pilot longer than that of transport crew
 - HQ finally agreed to replacement policy
- P-47s received first time in theater: range less than P-40, so limited as to almost useless
 - 5th AF depots developed 200 gallon belly tank which became standard equipment in theater (18:168-174)
- Remainder of Solomons campaign conducted basically with forces in being
- Culmination of Solomons campaign in capture of Bougainville
 - Gen Twining left to command 15th AF in Italy
- State of 13th AF at end 1943
 - Uniquely organized to operate with other services under COMSOPAC
 - Many problems encountered and solved, but morale still major one
 - Malaria, dengue fever, and other diseases

- Physical and mental exhaustion
- Poor living conditions
- Malaria affected 788 men per 1000 per year in Jun 43
(Army in theater)
- 13th AF lost 72.18 days per 100 flying officers in Mar 43
- Losses from malaria exceeded combat losses until Aug 43
- By Nov 43, 80% messes and latrines screened
- Service troops' morale even lower: no recognition
- Conditions for naval personnel invariably better than for Army
- Quality of food major area of complaint
- Greatest single factor: rotation and rest policy -
jungle islands so isolated from any semblance of
civilization
- Not enough transports to rotate personnel to rest areas
- By Apr 43, had enough C-87s to begin rotating flight
crews through New Zealand for rest
- Ground crews still got no relief beyond 1.5% monthly
replacement rate
- Of 24,232 man-days lost to 13th AF in Dec 43, only 219
attributed to enemy action
- Service and supply labored under logistical paradox: highly
mobile island warfare, but no ground mobility
- Trucks and heavy equipment moved only by sea - never
seemed to be at right place at right time
- All bases had to be hacked from the jungle
- Parts never followed units as closely as necessary
- Resulted in arc-welding broken axles, using wooden
brake linings to replace one missing, trading or
stealing from Marines and Navy
- Misuse of service troops: commanders mistook "service

groups" for "labor battalions"

- Improvisation and "native engineering skill" order of day:
brake drum lathe locally designed and manufactured,
mufflers made from 90 mm cartridge cases, power hoists made
for bomb service trucks, gun mounts from cut up truck beds
(18:245, 268-280)

- 7th Air Force based in Hawaii

- Mostly defensive operations and reconnaissance since Pearl Harbor, except for battle of Midway

- Assigned to Central Pacific command of Navy

- Reservoir of emergency replacements for other theaters and forwarding agency for units assigned to other theaters

- Caused tremendous personnel turnover problems

- VII Air Force Service Command

- Quartered, rationed, and supplied all casualties passing through

- Responsible for readying planes for combat

- Hawaiian Air Depot major repair, supply, and modification center for entire PTO

- 40 warehouses on Oahu plus additional supply dumps

- No troop carrier unit, air supply only by loading bombers headed to wherever

- Depot modifications included nose turret, extra guns, and blister windows for B-24Ds

- 7th AF began preparation for first offensive operations against Gilberts and Marshalls, summer 43 (Galvanic)

- Units would be staging through and capturing small islands up to 2000 miles from Hawaii

- Air service support squadron (ASSRON) designed as provisional unit to handle service activities

- Reduced amounts of men and equipment

- Motorized shops and easily transportable equipment

- Responsible for repair, supply, evacuation, sanitation, construction, transportation, traffic control, salvage, graves registration, burials, quartering, training of service units, estimation and supervision of funds, and anything else required
- Four ASSRONs formed, originally thought would move from island to island with advance, but concept eventually abandoned
- Standard service groups in use by Jul 44
- Supply problems, added difficulties because of joint command
 - Fullest cooperation necessary between services and usually obtained
- Personnel shortages, especially labor troops
 - Air base security battalions disbanded and used as labor
- Galvanic operations commenced mid-Nov
 - Standard primitive conditions as islands captured and air units moved forward (18:281, 288-290, 294-298, 308)
- Counter-attack through Solomons and New Guinea culminated in isolation, reduction, and by-pass of Rabaul and Cape Gloucester by Mar 44 (18:311)
- China-Burma-India (CBI) theater - 10th Air Force
 - Longest US supply line - across India, Middle East, North Africa, and Atlantic Ocean
 - Only link between China and allies after Burma fell was air route over Himalayas (18000 feet) - "the Hump" (18:405-406)
 - Main mission of 10th AF was protection and maintenance of air supply link to China
 - Same old story of not enough of anything, additionally, major percentage of 10th detached to Middle East to solve crisis there vs Rommel
- 10th was skeleton and supply line was thin thread throughout 42

- By end 42, had 259 combat planes: 32 heavy bombers (10 nonoperational), 43 medium bombers, 184 fighters (many practically useless)
- Dec convoy brought three service squadrons, two depot squadrons, two quartermaster companies, one ordnance company, seven airway detachments, filler personnel for fighter and bomber groups, but without much of required organizational equipment
- Air Transport Command designated to fly "Hump" beginning Dec
- 10th AF divided into China Air Task Force (CATF) and India Air Task Force (IATF)
- CATF separated from 10th and activated as 14th Air Force under Chennault 10 Mar 43
- Successful operations dependent on logistical support delivered by ATC
- Increase in ATC resources basically on schedule early 43
- Projected need of 10000 tons/month over Hump for 14th operations - had to keep China in war (18:410, 415, 420-421, 435-443)
- Efforts to greatly increase airlift failed
- 140 transports on hand, including 12 C-87s (cargo B-24s), 46 C-46s
- Only 2200 tons in Jun, 4500 tons in Jul, 5000 tons in Sep
- Had the planes necessary: 43 C-87s, 105 C-46s, 82 C-47s and C-53s as of 14 Sep 43
- Success dependent upon
 - Sufficient numbers of aircraft
 - Enough supplies flowing from Calcutta to Assam
 - Sufficient personnel and equipment at Assam to process and load supplies on transports
 - Adequate facilities at Assam
- First two conditions met, latter two not, with lack of

- facilities probably the greatest single negative factor
- British responsible for construction: monsoon rains, native laborers scared off by Japanese bombing, lack of construction equipment and material
- C-46 aircraft had serious problems and depot fix applied in India insufficient
- Inadequate maintenance and repair facilities at Assam: average 100 planes grounded per day in Aug
- ATC pilots inexperienced
- Organizational and command relationships completely tangled (18:443-449)
- South and Southwest Pacific forces meanwhile moved through the Admiralties, Hollandia, and New Guinea toward juncture in the Philippines
- Most significant logistics action was increasing combat radius of P-38 to 650 miles by adding leading edge wing tanks and external wing tanks
- Tactical air units again moved forward in New Guinea without ground crews and maintenance equipment, by 3 Aug, 91 planes grounded
- Far East Air Forces (FEAF) activated 14 Jun 44, under which were 13th and 5th AF, and Far East Air Force Service Command (FEAFSC) (18:587, 646, 648-649)
- Central Pacific forces ready for invasion of Marianas, Jun 44
- ***See map p. 673
- Truk, in Carolines would be neutralized and bypassed
- With capture of Guam, Saipan, and Tinian, engineers began preparation of B-29 bases (18:671-672, 676, 693)
- Saipan invaded 15 Jun 44, same day, first B-29 raids from China
- First truly strategic bombardment in PTO
- Acquisition of the B-29
- 10 Nov 39, Arnold asked War Dept permission to initiate development of four-engine bomber with 2000 mile radius of

- action and superior to B-17 and B-24
- Request for proposal issued to five leading manufacturers on 29 Jan 40
- Preliminary designs submitted by Boeing, Lockheed, Douglas, and Consolidated on 8 Apr (this is order of evaluation by board)
- Lockheed and Douglas withdraw
- 6 Sep, orders placed for two each experimental models from two remaining companies
- XB-29 (Boeing) first flew 21 Sep 41
- Air Corps took tremendous gamble because of gathering emergency: authorized full scale development and production on 17 May 41, six months before plane first flew
- 1664 planes on order on day of first flight!
- Many new features: pressurized cabin, remote control turrets, new engine design
- Production delays caused by design changes ordered by Air Corps (19:3-4, 6-9)
- Matterhorn: deployment of B-29s to India
 - 4 Apr 44, Twentieth Air Force activated, headquarters in Washington, Arnold commanding (strategic control retained out of theater for first time)
 - XX Bomber Command activated 27 Nov 43, to be fitted into already convoluted CBI command arrangements
 - Based in India, flying from China, bombing Japan
 - Matterhorn plan called for Commanding General, AAFIBS (Stratemeyer) to have administrative control, and Commanding General, 14th AF (Chennault) to have operational control and security of advance bases
 - Not permanently assigned to any theater
 - 58th Bombardment Wing (VH) activated 1 Jun 43
 - Four bomb groups, each with four bomb and four maintenance squadrons

- Organized so as to need minimum assistance from theater
 - sort of "air task force"
- Seven aircraft per squadron, 28 per group, 112 per wing; double crews
- Service and engineer troops deployed with wing to India (19:31, 39, 41-42, 44-45, 53, 55)
- Matterhorn logistics
 - Planning began Aug 43
 - Southern Bengal (India) chosen for rear area bases
 - Already many airdromes for B-24s, lengthen runways
 - Shortage of engineer troops to develop bases
 - Pipelines laid for aviation gasoline
 - Runway construction hampered by lack of equipment
 - Needed at least 7500 feet long
 - Ten inches of new concrete, or seven inches added over old
 - Much concrete had to be imported from US
 - Concrete spread by hand by native workers
 - Buildings of variety of types but generally adequate
 - Advance bases in China near Chengtu
 - Between 300,000 and 500,000 Chinese farmers conscripted to construct bases, plus 75,000 contract workers
 - Four bases built with runways 8500 feet, 19 inches thick, 52 hardstands each
 - Base of runways rounded rocks from streams, set with wet sand and gravel, and rolled
 - All work by hand
 - Work began 24 Jan, first B-29 landed 24 Apr, all fields open 1 May (19:58-73)
 - Everything needed in China had to be flown in

- Matterhorn plan said XX Bomber Command would fly its own supplies in using its B-29s and 20 C-87s
- Didn't work from the beginning, had to have help from Air Transport Command
- Had to supply units in China and stockpile for eventual missions against Japan
- Missions delayed because stockpiling behind schedule
- Needed 23 tons per B-29 per combat sortie
- Originally planned two 100-plane strikes
- Ordered to strike with at least 70 planes on 15 Jun
- Barely enough fuel to do it, some planes could not return to India
- Acrimonious debate between fighter and bomber people over who needed how much, and who decided who was going to get what (19:81-91)
- LeMay took command XX Bomber Command 29 Aug
- Reorganization throughout summer and fall 44
- End of Matterhorn
- Pulled out of China Jan 45 under threat of Japanese advances
- Still flew missions from India
- As B-29s started flying from Marianas, China missions/bases of less and less strategic importance
- Began flying tactical missions against targets in China and southeast Asia
- LeMay transferred to Marianas 18 Jan to command XXI Bomber Command
- XX Bomber Command just withered away as stripped of its units
- 6 Feb, orders received for redeployment to Marianas
- 58th Wing completed transfer 6 Jun (19:115, 119, 131-132,

157-175)

--Preparation for invasion of Philippines

---Allied Air Forces two to one advantage on paper

----However, forces spread from Australia to Guadalcanal to Biak

----Center of gravity of Allied forces 1000 miles from Morotai and Palaus, next stepping stones to Philippines

---Had to move forces to Netherlands New Guinea

---Far East Air Service Command (FEASC) would eventually move all its service organizations out of Australia (19:288-293)

--Men and weapons

---As of 31 Aug 44, Far East Air Forces showed total strength of 16,914 officers and 156,684 enlisted men

---Combat fatigue still a major problem with flight crews, tactical aircraft and transports

---Increased casualties during Philippine campaign

---Rotation policies contingent upon number of flying hours and availability of replacements

---Ground crews often watched complete turnovers in flight crews while they remained in combat zones

----Shortages of skilled technicians even more critical than shortages of flight crews

----Quotas for ground crew rotation so small in 44, would take eight years for complete rotation

---No air force-wide policy for rotation

---More P-38s flowing to theater and P-47s began to be replaced with P-51s

---Many B-25s reaching a maximum of combat hours, but no suitable replacement as medium bomber

----A-26 supposed to be replacement; heavily armed with good speed, bomb load, and combat radius, but visibility so restricted by long nose and engines forward of cockpit that pilots couldn't use it for CAS

in jungle terrain

- 31 Aug 44 FEAF had 2629 first-line combat planes assigned:
491 B-24s, 509 B-25s, 350 A-20s, 497 P-38s, 135 P-40s, 429
P-47s, 42 specialized night fighters, and 176
reconnaissance planes, plus 633 transports (19:323-340)
- 27 Oct 44, first US planes into Leyte, Philippines; 34 P-38s
- Airfield construction on Leyte
 - 35 inches of rain first 40 days of fighting - mud
 - Captured Japanese fields had to be rebuilt, not just fixed
 - Roads had to be rebuilt first
 - Difficult to obtain building materials - even tried pumping coral from ocean floor
 - Filipinos reluctant to work because of air raids and had all food they needed from looted Japanese stocks
 - Lack of bases was chief limiting factor on air operations
- Logistics factors hamper tactical operations
 - Airfield construction delays cost chance of easier victory (enemy able to bring in reinforcements) and threatened schedule of future operations
 - Leyte operation moved up, no time for adequate reconnaissance
 - Intelligence reports and estimates inaccurate
 - Underestimated rainfall
 - By Dec, planned to have 380 heavy bomber hardstands, only had 104
 - Shipping schedules so tight, decided to send ground echelons ahead of air
 - Ground crews in area subject to enemy attack with nothing to do
 - Air crews at rear bases, flying tactical missions in support of Leyte operations, with minimum ground support

- Invasions of Mindoro and Luzon followed (19:369, 383, 385-389)
- B-29s from the Marianas
- Unique command arrangements for Very Heavy Bombardment (VHB) forces made necessary division of responsibilities
 - CINCPOA responsibilities
 - Interbase wire communications, assignment of communication frequencies and call signs
 - Gasoline storage and distribution system
 - Construction and maintenance of base facilities
 - Miscellaneous support
 - All support channels
 - Commander, XX Air Force responsibilities
 - First, second, and third echelon supply and maintenance
 - Establishing and operating fourth echelon supply and maintenance depots
 - Communications systems required by XX Air Force
 - Motor transport forward of depots in Marianas
- CINCPOA had authority to resolve disputes
- ***Wiring diagram p. 513
- Bases for the bombers
 - Eventually two fields each on Tinian and Guam, one on Saipan
 - Guam also had air depot and Headquarters, XXI Bomber Command
 - Construction delayed by other requirements and following logistical difficulties
 - Tropical rains
 - Roads from coral pits impassable, hard on trucks; resources diverted to hard surface them

- Enemy air raids
- Hard coral just beneath soil surface had to be blasted
- First B-29 arrived Saipan 12 Oct, final paving, other facilities incomplete
- Logistical support
 - XXI Bomber Command had no control over its logistical support
 - Had no air service command, air depot, aviation engineer battalions, or ordnance companies
 - "Logistical channels . . . circuitous, cumbersome, and confusing (19:537)"
 - Example, to construct airfields:
 - Requisition to Army Garrison Force, screened to see if existing Army facility available
 - Next, to island commander, screened to see if any other island facility available
 - ComForwardArea approved or disapproved
 - If approved, returned to island commander for priority assignment and unit to do work
 - Construction materials from Army Garrison Force or requisitioned from mainland through Western Pacific Base Command
 - Shipping priority and vessel allocation for materials from CINCPAC
 - No wonder building request for XXI Command headquarters had 26 separate endorsements before approved
 - Somehow the system worked; most extensive build-up in comparable time period of entire war
 - Aircraft build-up so rapid outstripped crew build-up
 - Approved ratio was 1.25 crews/plane
 - LeMay wanted 2 crews/plane, but wasn't even getting the 1.25

- Supply and maintenance had planes able to operate 114.9 hours per month per aircraft; maximum for crews in extended operations was 75 hours per month per crew
- Two supply shortages which impacted operations
 - Shortage of spare parts grounded significant number aircraft Nov to Mar
 - Shortage of incendiary bombs through late summer following Mar fire raids
- Guam Air Depot not operational when first strikes launched in Nov
 - Construction had low priority
 - Supplies stacked along roads
 - Specialists had to build own facilities before able to do job for which trained
- Maintenance and supply centralized under deputy chief of staff for supply and maintenance
 - Supply specialists organized in work pools, maintenance used specialized and production line techniques
 - Significant reductions in aborts for maintenance and aircraft grounded for parts, increase in supply efficiency (19:507-525, 536-545)
- Strategic bombing campaign proceeded with minor interruptions in support of Iwo Jima and Okinawa tactical efforts
 - Daylight high level precision bombing subsequently gave way to low level night incendiary fire raids
 - Culminating in atomic bombs on Hiroshima and Nagasaki
- V-J Day 14 Aug 45

LESSON 6

TITLE: Between WW II and Korea

METHOD OF PRESENTATION: Lecture, Guided discussion

STUDENT PREPARATION: Read "A Proposed Department of Logistics"

PLAN OF PRESENTATION:

-Introduction

--Massive demobilization after WW II

---Obviously tremendous impact on all facets of military

--Separate "Department of Logistics" topic of major discussion

-WW II analyzed for lessons learned

--Airpower is dominant

---Discuss why they would think so and if it really was

---Is it dominant today?

--Importance of scientific advances

---Contrast with recent questioning of "gold-plated" weapons and "star wars" defense

---Reasons: radar, sonar, AAA proximity fuses, B-17s and B-29s, jet engines (ME-262), specialized equipment (ex: landing craft), atomic weapons

--High quality integrated intelligence service

---Lack of cooperation

---Have we learned this one?

--Closer coordination between foreign policy and military capability

---Those who make policy must understand capability

---Must have or create capability to sustain policy

- Unity of command in field
 - Recommended a single Secretary of National Defense
- US basic strength in industrial power
 - Is this still true? Where is our basic strength?
- US will be first attacked in next war (59:1-2)
- Analysis of world situation
 - Germany no longer military threat
 - Britain weakened
 - France impotent
 - China no industrial capacity, but lots of manpower
 - Leaves US and USSR as dominant world powers
 - Note no discussion of Japan
- State of US armed forces
 - Reduced from 12 million to 1.75 million
 - 90% reduction
 - Capabilities not possibilities must govern size of forces (59:2-4)
- Requirements for future
 - Since US will not initiate war, large numbers necessary to defend against total war (59:4-7)
 - Total mobilization required to supplement forces in being (59:9)
 - More troops in regular army before WW II (59:10)
 - Universal Military Training (UMT) instead of extending Selective Service (2 charts from War Dept Basic Plan)
 - Men only; not actually inducted
 - Not available for combat or other assignments during training

- All physically and mentally fit at age 18: deferments until 20 if still in high school, volunteers at 17
 - No exemptions
 - 12 months of training
 - Some go to regulars, reserves, national guard, and various officer training programs (59:12-15)
- Beginnings of AF interest in and actual work on computers
 - Working on scientific planning techniques since 1943
 - Working on electronic computer and techniques to use it in planning since approx. Oct 1946
 - Objective: to compute in hours what usually took months
 - \$400,000 to National Bureau of Standards in Jun 47 for actual work on computer (52:2)
- Aircraft Maintenance
 - Organizational: preventive maintenance to include "proper care, use, cleaning, operation, preservation, servicing, routine and periodic inspections, minor repair not requiring disassembly of sub-assemblies, replacement of assemblies and sub-assemblies, and accomplishment of instructions as directed in Technical Orders and other applicable directives (1:Ch 1, 1)"
 - Field: corrective maintenance to include "repairs requiring fixed shops or ground mobile equipment, replacement of major unit assemblies, fabrication of parts, accomplishment of instructions as directed in Technical Orders and other applicable directives, and such assistance to lower echelons as is necessary (1:Ch 1, 2)"
 - Depot: "restore worn or damaged equipment to a serviceable condition and the periodic overhaul of assemblies, accessories, and auxiliary items as prescribed in Technical Orders and other applicable directives; replacement and repair of auxiliary equipment; fabrication of such parts as may be required in emergency; and technical advice and assistance on maintenance matters to AF activities (1:Ch 1, 2)"
 - AF Technical Orders
 - Specific directives and technical information for

operation, maintenance, storage, inspection, etc. of AF equipment and materials

---"URGENT" - "Immediate Attention" or "As Soon As Possible"

---"ROUTINE" - "As Soon As Practicable" or "Orders for Accomplishment of Work When Directed by Air Materiel Command" or "Operational and Informatory Technical Orders"

--Aircraft Inspection and Maintenance Guides

---Pertinent inspection and maintenance data and supplementary information for inspectors, crew chiefs, mechanics, and others

---Summarizes more detailed information from Erection and Maintenance Handbooks and TOs (1:Ch 4, 1-4. 2)

--Aircraft inspection policies

---Preflight: before first flight of each day

---Daily: complete visual check (control surfaces, landing gear, tires, fuel and oil leaks, etc.); no disassembly

---25 hr (minor): preflight and daily + others; assure aircraft in good operating condition

---50 hr (major): preflight, daily, and 25 hr items + others; "complete, thorough, and searching inspection of the entire acft"

---100 hr (major): more thorough than 50 hr; all previous items + others

---Other inspections: at engine change, 25 hrs after engine change, acceptance inspections, organizational inspections (QC - at least 25% of minor and major aircraft inspection observed by inspector; each aircraft inspected once a month) (1:Ch 4, 2-4, 3)

--Whenever practical one crew per aircraft; mandatory to have crew chief (1:Ch 4, 4)

--Commanders/staff officers have option of production line method, crew chief method, consolidated method, or specialized method for performing major inspections (1:Ch 5, 1)

-Air Materiel Command (AMC)

--Mission

- To provide materiel and to support personnel
- Efficient and economical provision of peacetime AF
- Planning for expanded requirements of wartime (14:1)
- Seven specific programs implemented to accomplish mission
 - Training: OJT and through AFIT
 - Industrial planning: accelerated production in national emergency through supporting and maintaining healthy acft industry, controlling government reserve plants, storing general purpose tools, stock-piling strategic, critical materials, advance preparation of peacetime industry
 - Technical intelligence: ascertain extent of foreign R&D efforts
 - Research and development: cooperation with industry and science; from limited basic research to full flight tests
 - Procurement
 - Supply: stock reporting, standard nomenclature, uniform property ID; receipt, shipment, storage, preservation, issue, and stock control
 - Maintenance: organizational and field at base, depot responsibility of AMC (14:1-4)
- Wiring diagram of USAF
 - AMC a coordinate major command
 - Previously Air Technical Service Command - Air Service Command and Materiel Command combined in 1944 (14:5)
- Wiring diagrams of HQ AMC organization and AMC itself
 - HQ AMC organized into 3 directorates: R&D, procurement and industrial mobilization planning, supply and maintenance (14:8-9)
 - AMC organized 2 groups: control elements at HQ and operational elements at field installations
 - HQ at Wright Field: all control elements, engineering R&D, testing, procurement, industrial planning, technical intelligence, educational training

- First major subdivision: 7 Air Materiel Areas - supply and maintenance support of AF units in geographical area; each contain Area Air Depot, specialized depots, aircraft storage fields, AMC bases, other facilities
- Area Air Depots: store and issue supplies for which AF has bulk storage and issue responsibility; depot maintenance; technical assistance
- Specialized depots: stock items which cannot be stocked at all depots
- Aircraft storage fields: store aircraft (14:9-11)
- HQ AMC 3 areas of operation
 - R&D for new and improved equipment
 - Continued close contact with industry
 - Furnishing supplies and equipment and performing depot maintenance (14:14)
- Proposals for a separate logistics service
 - Purpose: logistical planning and operations within national military establishment
 - Would not duplicate efforts of agencies created by National Security Act
 - Include logistics operations common to all armed forces
 - Not relieve armed forces of command responsibilities for logistics (40:13)
 - Factors affecting establishment of a logistics service
 - Military policy, industrial potential, natural resources, national finance (35:5)
 - Primary functions
 - Industrial mobilization planning
 - Military-industrial liaison
 - Coordination of procurement
 - Coordination of requirements

- Control and procurement of critical materials
- Coordination of R&D (35:9)
- Secondary functions
 - Disposal of surplus, salvage, and scrap for armed forces
 - Uniform stock control system for armed forces
 - Control of warehousing and distribution of all items required by armed forces
 - Coordination and control of technical intelligence activities of armed forces
 - Control of transportation of armed forces
 - Provide maintenance services and facilities of all types in mutually agreed echelons
 - Perform all construction work for armed forces, including construction units for tactical purposes
 - Operate common communications facilities
 - Operate and control post exchange and related activities
 - Disburse appropriated funds and provide auditing services
 - Provide medical services including hospitals and medical personnel
 - Control services common to armed forces (quartermaster, engineer, chemical corps, etc.) (40:13-16)
- Advantages of separate service
 - Study and formulate adequate plans for industrial mobilization
 - Reduce necessity for numerous coordinating agencies during war; reduce costs of procurement
 - Control use and stockpiling of critical raw materials
 - Coordinate R&D efforts avoiding duplication
- Disadvantages

---Great concentration of power and authority

---Attracting and keeping qualified civilians (35:21-22)

--Discussion

---Is a fourth service of logistics necessary now?

---Do the GSA and DLA give us the advantages mentioned?

LESSONS 7 & 8

TITLE OF LESSON: Berlin Airlift

METHOD OF PRESENTATION: Lecture, Guided discussion

STUDENT PREPARATION: Read article "Turning Point: The Bridge to Berlin" by Rosalyn O. Barry

PLAN OF PRESENTATION:

-Background

--End WW II, US confident maintain Russians as allies

--Germany divided 4 sectors: US, France, Britain, USSR

---Agreed upon at Yalta Conference

---Berlin also divided

--Russians controlled access to Berlin

---Also currency, ration stamps, communications, education

---No written guarantees of access

---Temporary verbal agreement

--Berlin supplies

---US supplied food to western sectors

---British supplied coal (from Ruhr - their sector)

---Access by one railroad, autobahn, canal network, 3 20-mile wide air corridors

--Russian policy to communize Europe

---Essential to control all Berlin

---Berliners aloof and stubborn - psychological and symbolic key (9:70; 15:13)

-Events leading to blockade

--Planned "incidents, confrontations, disagreements (9:70)"

- Feb 48, Czechoslovakia occupied
- 20 Mar, Russian representative walked out of Allied Control Council meeting
- Gen Clay secretly warned Washington of strained relations and possibility of war
- Others also concerned: Dr. Eugene Schwartz, Chief Public Health Officer for American sector, had been stockpiling medical supplies; Ernst Reuter (elected Lord Mayor but Russians prevented taking office) smuggled blueprints of transportation and public utilities systems to west Berlin
- Five days after control council breakup - Clay continued urgent cables to Washington: advised against evacuation of American dependents
- Clay ordered formulation of "Basic Assumption Plan" - assumed Russians would cut off all supplies to Berlin
- American commandant of Berlin (Col Frank Howley) gave staff (12 men) 4 hrs to find out how much each department needed to keep city supplied for 2 months
- Estimates barely reasonable, except for Schwarz - had stockpiled 6 mo. of medical supplies
- British military train stopped, 2 carloads German passengers detached
- 1 Apr, trains stopped again to check travel passes - Russians had no authority over other allies
- 5 Apr, British airliner and Russian Yak 3 collided after Yak "buzzed" airliner (in corridor)
- 12 Apr, Russians ordered autobahn aid stations closed
- 17 Apr, Russians stopped regular exchange of milk for US flour
- 11 Jun, inbound freight stopped for 24 hrs
- 13 Jun, closed main highway, reopened 24 hrs later
- 14 Jun, autobahn bridge over Elbe River closed for "repairs"
- 20 Jun 48, Russians walk-out of Kommandatura (4-power

governing body of Berlin) (9:70; 15:1, 2, 7-9, 13-16, 17-25, 34-36)

--Currency crisis

---Inflation caused by Russians flooding west Berlin with paper money

---Western powers issued new money, agreed on new constitution for west Germany on 20 Jun; same currency reforms for west Berlin on 23 Jun (9:70; 15:40-41, 43)

-Blockade

--23 Jun 48, Russians declared no rail traffic, beginning at 0600 next day due to "technical difficulties"

---Pilots could see torn up track

--Water traffic halted

--Coal shipments halted

--Electric power produced in Soviet sector no longer supplied to west - "shortage of coal"

--autobahn closed - "technical difficulties" (9:71)

-Allied response - airlift

--Gen Lucius Clay: military governor of US sector

---No thought of pulling out of Berlin

--Clay's staff reacts: overall uncertain

---Robert Murphy, political advisor: US must stay

---MG Robert Walsh, Intelligence: Russians will give in if stand up to them

---Lawrence Wilkinson, economic advisor: supported staying

---Others: felt support from army and State Dept weak; low manpower, impossible to defend Berlin, convinced Russians willing to go to war

---No group recommendations or consensus

--Clay's original plan

- Armed convoy 200 trucks, engineer battalion, recoilless rifle troop, constabulary regiment to break blockade
- 3 objectives: call Russians' bluff, show intention to clear road, assert rights to stay in city
- Intell reports convinced Clay Russians bluffing - not want war (15:54)
- British opposed Clay's plan and threatened withdrawal of support, even in event of war
 - Proposed resupply by air - Clay felt impossible (15:55-56)
- President Truman and Pentagon would not risk war through confrontation on autobahn (9:70)
- Clay's battle with Washington (25 Jun): Secretary of Army Kenneth Royall, Chief of Staff Gen J. Lawton Collins
 - Royall - no action to provoke armed conflict, possibly delay currency reform
 - Currency distribution already begun, again advocated firmness - Clay
 - Royall - evacuate dependents
 - Clay - no (15:59-60)
- Clay also sought and received support of Reuter
- Air was only open route
- Previous airlift attempts
 - British in WW I: failed
 - Russians at Leningrad: failed
 - Germans at Stalingrad: failed
 - Only successful one was US over the Hump in CBI WW II
- Berlin different
 - Hump lift from 13 bases to 9 landing fields
 - Interruptions acceptable because fewer people

- Berlin 3 corridors, 2 landing fields
- Operations necessary almost every day, weather notoriously bad
- 2.5 million people
- 4000 tons/day required for bare subsistence
- 8000 tons/day required for normal operation
- Best month in CBI was 72000 tons
- Clay's initial estimates: 3-4 weeks (9:70, 71)
- Mechanics of the airlift - Operation Vittles
 - Decision for airlift made without any type of planning and little evaluation of capability
 - Clay still did not believe long-term lift possible
 - Lt Gen Curtis LeMay, commander USAFE, to organize airlift; told to haul coal and then "haul some more"
 - Few resources: planes or pilots
 - British might contribute 150 acft, French none (Indo-China)
 - Only 2 troop carrier groups of C-47s (102 aircraft) in Europe: 6000 lb capacity, 180 mph cruise
 - First missions 26 Jun; 80 tons: milk, flour, medicine
 - Only 3 years since same people bombing Berlin
 - British used north corridor to fly in, US used southern; both flew out center corridor
 - Timing critical
 - Supply bases at Wiesbaden and Rhein-Main
 - Templehof (US sector)
 - Took off on sodded runway
 - Landed on metal over rubble
 - 400-ft brewery smokestack at one end

- Apartment buildings and 5-story former Nazi administrative building against edge of field
- Gatow (British sector)
 - 1500 yd pierced steel runway (rip up tires)
 - 2000 yd concrete runway under construction
 - Former Luftwaffe training base - no facilities
- Other factors
 - First 6 weeks very hectic
 - Coal dust into everything
 - Not enough aircrews: exhaustion
 - Ground crews often worked round the clock
 - By week 5 had 75 crews - enough to provide some rest (9:71-72; 15:63-64)
- Food supplies already in stock
 - 17 days' supply bread grains and flour
 - 32 days' supply cereal
 - 48 days' supply fats
 - 25 days' supply meat and fish
 - 26 days' supply skimmed and dried milk
- Total daily requirements 13500 tons vs. total capability 700 tons
- 27 Jun, decision to plan for 21-45 day airlift (15:64)
- British pledged full support and not to pull out of Berlin (15:65)
- Washington decision making
 - Meeting with Pres Truman: SecDef James Forrestal, SecArmy Royall, Under SecState Robert Lovett
 - 3 options: "to remain under stress of weekly crises, to supply the city by air and risk war, or to quit Berlin"

- Truman absolutely refused to pull out
 - Wanted full-scale airlift, fully organized
 - 2 squadrons B-29s moved from Goose Bay Labrador to Germany
 - 2 squadrons B-29s moved to England (15:66-67)
- "LeMay Coal and Feed Company - Round-the-Clock Service Guaranteed" (15:72)
- Last week in June, statements of support issued by governments of US, Britain, France
 - Becoming much more at stake than feeding Berlin (15:73)
- Allied diplomatic options
 - Formal protest
 - UN discussion
 - Economic sanctions (ex: closing Panama and Suez Canals to Soviet shipping)
 - Break diplomatic relations (15:74)
- Pentagon did not fill Clay's request for planes (C-54s)
 - 10 Jul, tried to convince Bradley (Chmn Joint Chiefs) of need for 50 C-54s - no action
 - Still pushing for armored column down autobahn
- 17 Jul, Clay called to Washington to discuss situation
 - Cabinet and NSC not sympathetic
 - Joint Chiefs estimating 18 mo. to remobilize if war
 - Truman more sympathetic than others
- Clay made case
 - 2500 tons food/day
 - Fuel requirements would be 4500 tons/day
 - Currently 52 C-54s and 80 C-47s

- Wanted fleet of 160 C-54s
- Vandenburg (CofS, AF) says would totally disrupt MATS
- Royall still opposed to convoy idea
- Lovett worried about fighter attacks on airlift bases
- Truman points out airlift less risky than convoy - leaves meeting without formal agreement or orders
- Clay called to meet with President later - Truman says he's overruled JCS and he'll get the C-54s
 - Clay asks permission to release news to press - ensuring no more opposition (15:89-93)
- C-54s transferred from MATS to airlift
 - Had to fly same speed as C-47s because of block scheduling
 - Blocks of 3 planes, 2 round trips/day
 - Takeoff every 3 mins
 - At Tempelhof, landing or takeoff every 90 secs
 - Corridors only 20 miles wide; 500 ft vertical separation (9:72-73)
- MG William H. Tunner takes command of airlift (29 Jul 48)
 - Had commanded Hump airlift
- Tunner's initiatives: changed haphazard "seat of pants" operation to totally regimented one
 - Set up one-way traffic flow - two and a half min separation
 - No go-arounds: missed approach return to home base fully loaded
 - Used electronic beacons as checkpoints
 - Planes immediately fueled and loaded
 - Flight crews not to leave planes in Berlin: mobile snack bars, weather men, and ops officers
 - Ordered PR to start newspaper: humor, tonnages -

competition

- Initiated use of GCA
- Used time and motion studies to cut turnaround times
- Used German mechanics and reopened former Luftwaffe repair base (9:73-73; 15:97, 99-102)
- Ground transportation system
 - Supplies by rail to Wiesbaden and Rhein-Main
 - Trucks from trains to planes
 - Trucks timed to fit aircraft timing (9:74)
- 13 Nov, fog over central Europe projected to last for weeks
 - Tunner ordered flying in zero-zero
 - Less than 50 days' coal supply left in Berlin
- Expansion of airlift
 - 3rd runways built at Tempelhof and Gatow
 - Heavy construction equipment cut apart, flown in, and reassembled
 - 3rd field built in French sector at Tegel (20000 Berliners volunteered to help) (9:74)
- End of the airlift
 - By end of summer, 5000 tons/day
 - Successful throughout winter
 - Resumed negotiations 15 Mar 49
 - 5 May, Russians announced restrictions lifted 12 May
- Totals (airlift continued until 30 Sep to insure stockpiles)
 - 276,926 total flights
 - 2,323.067 tons
 - 689 aircraft (441 US, 147 RAF, 101 Brit charter)

---124 million miles

---\$350 million cost

---79 fatalities (9:75; 15:158)

----Numbers of fatalities differ by author

-Comparison

--20 C-5s flying 6 hrs could accomplish entire airlift (66:46)

LESSONS 9 & 10

TITLE OF LESSON: Korean War

METHOD OF PRESENTATION: Lecture, Guided Discussion

STUDENT PREPARATION: Read "The War in Korea" by General Otto P. Weyland, and "Air Force Logistics in the Theater of Operations" by Major General Paul E. Ruestow

PLAN OF PRESENTATION:

-Background: The war

--The opposing forces (as of 25 Jun 1950)

---North Korean People's Army (NKPA): 9 infantry divisions, 1 armored division; 13 more divisions added first 2 months of war

---North Korean Air Force (NKAF): approximately 150 obsolete Russian planes

---Republic of Korea Army (ROKA): 6 infantry division (largest weapon was 81 mm mortar)

---Republic of Korea Air Force (ROKAF): 10 T-6 trainers

---Far East Air Forces (FEAF): 5 fighter wings, 2 bomber wings, 1 transport wing, plus supporting units (1172 aircraft); located in Japan, Okinawa, Guam, Philippines

--North Korean advance

---Assault began 25 Jun, by 29 Jun Seoul overrun

---ROKA in full retreat, token resistance

---FEAF's first efforts: evacuation of US nationals; after given permission to operate north of 38th parallel, concentrated on NKAF, resulting in total control of air; remaining effort in close air support of retreating armies, to make up for lack of fire power and heavy weapons

---Late July, FEAF could start first efforts against extended NKPA supply lines; Pusan perimeter had been established and situation stabilized

- United Nations Command (UNC) breakout
 - Began 15 Sep; from Pusan, and Inchon landing
 - NKPA had been decimated by interdiction campaign; offered little organized resistance
 - UNC advance hampered by destruction in path
 - UNC forces outran supplies: supply by air - C-119s, C-47s, C-54s
 - Reached Yalu River (border with China) end Oct
- Chinese Communist Forces (CCF) attack and advance
 - Began on 26 Nov
 - CCF in overwhelming numbers; UNC forces withdrew with heavy losses
 - FEAF again called on for close air support
 - CCF forces forced to move and fight at night
 - CCF advance slowed and halted at 38th parallel for a time, then resumed
 - Advance finally halted on line Pyongtaek-Wonju, south of Seoul (approximately 4 Jan 51)
- UNC counterattack and advance
 - Able to do so because CCF logistics collapsed under weight of air attack
 - Final stalemate lines established near 38th parallel
 - Chose to advance no further because: Chinese could pour in "unlimited" manpower if they wanted; as got further north, CCF supply lines shorter while UNC lines longer; good defensive positions in area
 - Final stable positions maintained next two years until armistice (63:3-13)
- Support of tactical air operations in Korea
 - First 20 months led to following conclusions
 - Doctrine and policy should emphasize forward staging of

fighters and light bombers

---Doctrine should emphasize close cooperation between operations and supporting forces

---A system of "rear area support" should be instituted using a specialized maintenance philosophy

--Rear area maintenance defined

---Many variations, but essentially entails splitting operational wing into forward element of tactical fighters flying from unimproved base(s) and rear element of supporting personnel with at least semi-permanent facilities

--Advantages of rear area maintenance

---Increased mobility - allows tactical forces to stay close to fluid front lines; reduces transportation requirements

---Facilities - stable, can be improved; better probability of adequate water, power, and transportation network

---Working conditions - leads to greatest single improvement in productivity

---Specialized maintenance - fewer highly skilled people required; unskilled trained faster

---Utilization of indigenous personnel - for base housekeeping, supply handling, and simple maintenance tasks

---Transportation net - better facilities of all types available

---Forward support - fewer people at forward bases involved in purely supporting activities

---Logistic channels - channels to rear bases well established; forward bases can be moved without disrupting supply flow

---Supply control - standardized, with consumption data gathered; inadequate storage areas at forward bases

---Control of rear maintenance still with wing commander (as opposed to sub-depot arrangement)

---Defense advantages - less vulnerable to enemy attack; nucleus of new organization if forward base wiped out

--Disadvantages

- Additional personnel required to operate two bases
- Coordination - between operations and maintenance - an absolute necessity
- Area of supervision - expanded for wing commander; requires accurate delegation
- Transit time - between forward and rear areas
- Time lost to weather - not a major factor, but should not be neglected

--Conclusions regarding support of tactical forces

- Highly desirable to have tactical air forces within a few minutes of front lines and able to move with changing front lines
- Transportation facilities are usually unable to cope with rapid, simultaneous movement of an entire combat wing with total allocation of equipment
- Operations and support must fully inform each other of current situation and plans for future
- Rear area maintenance is one key to rapidly shifting, fluid situations
- Crew chief system inadequate for maintaining modern aircraft
- Specialized maintenance operations will produce a high quality product when there is proper supervision
- "War weary" aircraft which cannot be retired because of shortages require an inordinate amount of maintenance (55:1-5)

-Air transport

--FEAF Combat Cargo Command and 315th Air Division

- One fleet of cargo planes for dropping airborne troops, dropping supplies, and cargo and personnel movements
- MG William H. Tunner first commander (notice how his name keeps popping up: CBI, Berlin, now Korea; all airlift)

--Basic airlift concept

- Centralized control over one airlift fleet
- Direct responsibility to theater air commander
- Flexibility
- Yielding reliable transport, adequate for all needs

--Organization

- Airlift capacity allocated to using commands in tons by Far East Command Joint Air Priorities Board
- Priorities determined by Joint Airlift Control Organization (JAFECO)
- 315th Air Division not responsible for allocation or priorities
- 315th concerned with maintaining responsibility for decisions regarding how to accomplish mission

--Operations: Transport Movement Control

- Controlled all airlift operations
- Duty officer adjusted schedule as necessary: weather, enemy action, changing requirements
- Communications allowed in flight or on ground diversion of aircraft

--Airlift totals

- Average 210 aircraft possessed, 140 combat ready
- 210,343 sorties
- 307,804 medical evacuation passengers
- 2,605,591 passengers
- 391,763 tons air freight
- 15,836,400 ton miles
- 128,336,700 passenger miles (Futrell:556-557)

--FEAF airlift lessons learned by end of war

---"Airlift missions and priorities should be established by the theater commander."

---"Airlift could not be allocated exclusively for the use of any service except for special one-time requirements."

---"All theater airlift should be concentrated to a maximum degree in one command for flexibility and best utilization." (28:569)

-Concurrent events

--Maintenance policies

---6 principles of maintenance

----Maintenance is responsibility of command

----Preventive maintenance essential

----Maintenance affects mobility

----Flexibility must be used in assigning maintenance responsibility

----Maintenance objective to provide operational equipment of right kind and amount

----Maintenance and supply mutually supporting

---10 specific policies listed

---Factors affecting maintenance: weather and climate, mission of organization, physical plant of base, experience of personnel (2:3-7)

--Strategic mobility and airlift

---SAC forces execute strikes, return to forward operating bases, and require immediate resupply

---Airlift visualized to provide concurrent movement of logistic support

---Strategic transport to haul equivalent of two to three railroad cars with same speed and range of bombers

---Components of strategic logistics system

----Standard containers

----Aircraft to hold several containers, over long range,
at high speed (60:1-5)

LESSONS 12 & 13

TITLE OF LESSON: Between Korea and Vietnam

METHOD OF PRESENTATION: Lecture, Guided discussion

STUDENT PREPARATION: Read "Ballistic Missile Logistics - A Forward Look" by Maj Gen W.F. McKee; "Notes on Logistic Consolidation in the United States Armed Forces" by Eccles; "The Problem of Organizing for Weapon System Management" by Davis; and "Major Changes in Logistics Management Since the Korean War"

PLAN OF PRESENTATION:

-Developments and changes since Korean War

--Developments - improved logistics policies, airlift role, maintaining control of Air Force assets (27:1)

--Problems to be met in 60s

---Technical complexity

---Uncertainty, which leads to necessity for responsiveness, ability to deploy forces, reduced vulnerability

---Pressures to economize (27:6)

--Role of airlift in meeting these problems

---Still takes months from requisition until delivery in Europe

---Aerial resupply, plus faster communications and paperwork processing, leads to greatly increased responsiveness of logistics system

---Also lead to economies

----Increased effectiveness by decreasing numbers of aircraft down for parts

----Reduced pipeline inventory

----High value parts with low demand rates can be centrally pooled (27:10-11)

- Requirements for cost effectiveness
 - Reasonably full payloads
 - High utilization rates
 - Airlift items must be of high enough value or criticality to justify expense (27:12)
- Wartime airlift role will be deployment
 - AF forces and other services
 - Three to five times the peacetime requirements
 - Dilemma: peacetime airlift economies do not fill force in-being required for immediate wartime response; therefore, must operate inefficiently in peacetime to meet wartime peak demands (27:12-13)
- Major changes since Korean War
 - AMC Management Evaluation System
 - Measure relative effectiveness of Air Materiel Areas (AMA) and depots
 - Internal competition, discover best operating methods originating in field
 - Trophies awarded; operated by AMC Comptroller
 - Raised effectiveness of AMAs and depots (51:2-4)
 - Executive control meeting
 - Concerned with performance and control, not policy
 - For AMC commander
 - Management by exception (51:5-7)
 - Decentralization
 - Command too big, trying to do too much at HQ - problems like traffic and floor space at WPAFB, plus one nuke and there goes entire logistics function
 - Asked for advice from other services, large civilian firms, management consultants

- Each of 14 specialized depots in CONUS became branch offices for operations then being performed by HQ
- Efficient, economical, safe
- Diverse and special management techniques for different kinds of property
- HQ can concentrate on command-wide problems
- Before decentralization: 1 of 15 people in command assigned to HQ; by 1956 1 of 32 (51:8-12)
- Local purchase
 - Decrease centrally procured inventories
 - Base commanders authorized to purchase low quantity, low value, common use items locally
 - 1952 - 75,000 local purchase items on stock lists; 1957 - 175,000
 - Better and faster at lower costs - no depot or pipeline inventories, transportation, personnel
 - Depots concentrate on high value, military items
 - Purchases from small businesses up (51:13-16)
- World-wide depot support
 - Previously, theater commands controlled overseas logistics forces, AMAs, and depots
 - Centralized control needed to realize full benefits of aerial resupply and electronic data processing (EDP)
 - Direct support from Zone of the Interior (ZI) depots, overseas production and maintenance sources
 - Supplies managed from ZI (51:17-20)
- Direct support to overseas customers
 - Based on "fast electronic requisitioning, simplified and standardized supply procedures, drastic reductions in paperwork, and airlift of supplies to overseas bases (51:21)"
 - Pipeline time cut

- No need for intermediate supply and control points
- Eliminates multiple handlings
- Less vulnerability to enemy action
- Reduced need for large safety stocks overseas - reduced facilities, personnel, excesses
- Greater standardization
- Problem: need for more airlift (51:21-24)
- Aerial resupply
 - By air direct from ZI
 - Electronic requisition
 - Dependent on adequate transportation and automation
 - Past, air used to cover breakdowns in surface transport or emergencies
 - First tested 1952: air resupply of SAC bomb wing in Britain
 - 1954: all SAC wings deployed overseas air resupplied
 - All US forces in Spain air resupplied
 - 1955: air resupply for aircraft permanently in Europe
 - Results: pipeline time down two-thirds; aircraft not mission capable awaiting parts less than 5% (51:25-27)
- Contract airlift (Logair)
 - Started Feb 1954 (chart of miles, costs, cost/ton mile, total tonnage, and load factor in reading)
 - Three objectives: maintain readiness for a potential D-day, at request delivery of high value and critical items, follow priority system of movement of goods
 - Overall objectives to shorten pipelines, minimize stockage, reduce numbers of items procured
 - Dual management: carriers furnished crews, aircraft, maintenance; AMC managed system and supervised all

operations

-----In eight months AOCP for ARDC went from 7.8% to 4.1%, SAC pipeline time for AOCPs went from 15 to 5 days, and requisitions for commercial charters were reduced (51:28-30)

---Electronic data processing equipment

-----Initial efforts 1947

-----May 1954: Logistical Systems Research and Planning Office under AMC Comptroller developed long-range plan

-----UNIVAC at AMC HQ in July 1954 (51:31-35)

---The Hi-Valu Program

-----Special controls over high cost items

-----Originated with need for control of small number of spares which accounted for large percentage of costs

-----Part of AF logistics modernization program

-----AF Spares Study Group: 3% of spares accounted for more than 50% of costs; 85% items in inventory cost less than \$10 each

-----In-depth control of each item did not make sense

-----Hi-Valu: close attention and special management actions

-----Inventory categorization program - divides spares and equipment: Cat I (Hi-Valu), Cat II (medium cost), Cat III (low cost)

-----Cat I items precisely controlled - in effect, separate supply system

-----11,000 Cat I items listed: spare parts for all first line aircraft, guided missiles, helicopters

-----Controls designed to insure austere forecasts of future requirements and obtain maximum benefits from hi-valu items

-----Responsibility of base Management Procedures Officer, Base Hi-Valu Control Officer, Base Hi-Valu Item Control Clerk

- Reduced requests to Congress by \$6.3 billion over 6 years - materiel funds
- Engine spares reduced from 43% to 23.5% of total spares costs (51:36-38; 54:2-3)
- Work Measurement System
 - System of measuring manpower used against engineered labor standards - to justify manpower requirements
 - Effectiveness increased from 54% to 85% from 1954 to 1957 (51:39-41)
- Mobile maintenance teams
 - Depot level mobile teams to repair damaged aircraft during wartime (51:42-44)
- Inspect and Repair as Necessary (IRAN)
 - Instead of making like new - depot level
 - Adopted in July 1953
 - Old system: too many aircraft out of commission too long
 - Shift from production line to dock system at depot
 - Very profitable: by 1954 38% reduction in out of commission time, 50% cut in maintenance costs, maintenance manhours down 55% (51:45-47)
- Bench check
 - Previously, inoperative items removed from aircraft and sent to depot
 - Required items to be benched checked prior to shipping to depot
 - \$6 million saved first six months
 - Tremendous backlog at depot alleviated
 - By end FY 54, \$27 million costs cut (51:48-50)
- MILSTRIP
 - Military Standard Requisitioning and Issue Procedure

--Aimed at unifying DOD procedures

---Eliminate waste, promote efficiency, speed supply actions,
save tax dollars

--Mandatory for all services 1 July 1962

---Same forms, codes, priorities, box markings, etc.

---Previously, 16 different systems in use

---Used in manual or electronic systems

--Disadvantages

---Less flexible than previous systems

---Status checks of requisitions limited (64:1, 4)

-LOGEX: Logistics Exercises (Fort Lee, Virginia)

--Army exercise with detailed participation of Army, Navy, and
AF

---Map exercise with umpires, and signal and clerical support

---Umpires introduce problems and carry out solutions of
student logistics officers who must keep forces supplied

--Scenario

---Based on invasion of southern France in WW II

---PREPARING FOR THE LAST WAR!

--Students learn lessons in interservice cooperation and
supporting combat forces (29:50-53)

-ICBM logistics

--ICBM logistics requirements entirely different from aircraft,
for two reasons

---Strategic mission requires them ready to go at moment's
notice - support must be responsive to operations to
greater degree

---Since weapon fixed in launch complex, maintenance goes to
them

- Supply and maintenance (separate for aircraft) much more closely linked for missiles
 - No depot overhauls
 - On-site maintenance remove and replace line replaceable units
 - Mobile maintenance teams
- Supply must be speed and control
 - Spares requirements will not be on "flying hour" computations
 - EDP use required (36:14-16)
- Continued debate regarding fourth service of logistics
 - Admiral Eccles prepared notes in response to debate
 - Driving force behind suggestions is waste and inefficiency, but are organizational faults the cause and is there too much or too little centralization?
 - Military system judged by combat effectiveness and economic efficiency
 - Theory and principles of logistics inadequately studied and understood
 - Principles
 - Logistics is military element of national economy and economic element of military operations
 - Logistics is bridge between national economy and tactical employment of forces
 - Logistics system must be in harmony with national economic system, and tactics and environment of combat units
 - Economic factors limit creation of combat forces; logistics factors limit employment of combat forces
 - Command uses logistics process to transform war potential into combat power
 - Logistics responsiveness and flexibility are keys to strategic flexibility

- The logistics system must be studied and understood as a whole
- Experience of others
 - British have separate ministry of supply - advise against separate system
 - French experience also negative
 - Big business decentralizing (24:3, 4, 5-6, 9-10)
- [This is a good article and should be used. Lecture should concentrate on discussing implications and relating following material to Eccles' points.]
- During WW II, Army - Navy had 26 separate storage and distribution systems
- Some coordination of supply items during war
 - Lumber, medical supplies, tractors, small arms and ammunition, etc.
- Secretaries Forrestal and Patterson ordered study toward end of war
- Interservice supply after passage of National Security Act
 - Services cut down to 12 supply systems total in DOD
- Legislative attention
 - Hoover Commission pointed out waste and inefficiencies, recommended consolidation of supply
 - Congress wanted integration of supply and service activities - essentially, a fourth service
 - Services lagged behind Congressional intentions, but made efforts to point out progress
 - DOD policy against fourth service - "working for a decentralized setup, with a proper umbrella or canopy of coordination (45:181)"
 - Direct contradiction of Congressional wishes
 - Hoover Commission final report still advocated fourth service instead of alternative of allowing a single service

to procure and distribute POL (for example) for all services

--Single manager plan - from SecDef Wilson early 1956

---Responsibility for managing supply of specific commodity to single military department secretary - requirements, purchasing, distribution

---To accomplish objectives of Hoover Commission, without changes to existing DOD structure

---An executive director of a separate agency would collate requirements of all services, switch stocks between services, decide how much to procure

---All services opposed plan, essentially did not trust other services to fill their needs and priorities

---Congress liked idea

---At time this material (Self) written, plan in process of being put into effect (45:171, 173, 176-184, 188-189, 197)

--Background of Defense Supply Agency (DSA) decision

---Debate over management of common supplies at least back to WW I

---Suggested in 1918 one agency buy all military supplies - rejected by Chairman War Industries Board (Bernard Baruch), too many disadvantages to centralization

---Several Congressional committees had hearings, bills introduced between 1920 - 1941

---Army-Navy Munitions Board established 1922 by Secretaries of War and the Navy - mission, in part, to coordinate war procurement plans

---Ministry of Munitions considered and rejected soon after Pearl Harbor

---Kilgore Bill 1943 proposed Office of Production and Supply - opposed by military departments - rejected

---1944-45 hearings regarding Department of Armed Forces, Army proposal for one supply agency for common supplies and hospital services - rejected by special JCS committee

---1947 DOD organization included Munitions Board for

- coordinating logistics of services, but lacked authority
- 1949 recommendations of first Hoover Commission resulted in creating General Services Administration (GSA) - supply all federal agencies; law exempted DOD if SecDef wanted
- 1955 second Hoover Commission recommended consolidated supply agency, civilian management, to supply common use, commercial-type items to all services
- All these actions increased pressure on SecDef who had two choices: ignore, and Congress would eventually legislate a fourth service of supply, or establish a single manager system ASAP
- Chose single managers - established for food, clothing, and textiles; medical supplies; petroleum
- Various DOD studies to assess single manager concept and suggest improvements
- General Supplies Study
 - Initiated Oct 58, by Armed Forces Supply Support Center
 - Differences in technical definition of "general supplies" among services; included:
 - Administrative and housekeeping supplies and equipment
 - Hand tools
 - Hardware and abrasives
 - Construction equipment and supplies
 - Automotive supplies and equipment
 - Electrical/electronic supplies and equipment
 - "Other type" general supplies
- Management of General Supplies (comprehensive study) completed Aug 59
 - Two more single managers recommended and approved
 - 6 Nov 59, Army single manager for general supplies, Navy single manager for industrial supplies
 - Recommended further studies on other commodities

- 1 Jun 60, Army named single manager for automotive and construction supplies
 - Implication: services now relying on other services for operational (i.e. combat related) equipment
- Recommended
 - Single integrated materiel distribution system for all single manager commodities
 - Uniform operating procedures for all single manager agencies
- Vance Committee
 - Commissioned by new SecDef McNamara (under Kennedy)
 - Submit three separate plans for managing common supplies
 - Continuation of single manager responsibilities assigned to individual services
 - Consolidated agency assigned to one military service
 - Consolidated agency outside services reporting directly to SecDef
 - 11 Jul 61 - report submitted, lists of advantages and disadvantages of all three plans, comprehensive (wasn't supposed to give recommendations)
- 31 Aug 61: McNamara announced formation of DSA (plan 3)
 - Include functions of Armed Forces Supply Support Center
 - Existing and future single managers
 - Military Traffic Management Agency
 - Surplus Sales Offices
 - Cataloging, standardization, coordinated procurement, utilization
 - Materiel inspection
 - Own distribution system using existing facilities (12:1, 2, 3-6, 6-9, 13, 62-63, 70-75, 76-77)

- Single manager for airlift concept
 - 10 years debate over single manager for airlift
 - Sep 45, Gen Vandenburg recommended consolidation of Air Transport Command and Troop Carrier Command to handle all air transport activities
 - Disagreements among MAJCOMs and staff - no implementation
 - General agreement in AF that AF should manage DOD airlift
 - 1948: NATS and ATC combined to form MATS
 - USAF Air Transport Symposium 1953
 - Recommended MATS and Combat Air Services Command (CASC)
 - CASC mission: support SAC peace and war, troop carrier duties, internal air support, cross training, and standardization
 - Contract carriers instead of MATS transport, MATS units absorbed by CASC
 - Study industrial funding
 - 4 Mar 54: Air Staff position to Chief of Staff (Gen Twining)
 - Kuter committee asked to review
 - Also reviewed proposal submitted by Gen Tunner (merge all airlift into one organization, industrially funded)
 - AF, Kuter, and Tunner studies all agreed on:
 - Serious deficiency in airlift capability
 - Needed civil support
 - Reorganization required
 - Opposition to various specifics resulted in further studies and recommendations
 - From Sep 54 through Nov 55
 - Nov 55: DOD finally agreed that consolidation of airlift functions should be implemented
 - Methodology of industrial funding became point of

contention

- AF recommended separation of military preparedness aspects, to be charged against appropriated funds
- One study group recommended removing "all military concepts, requirements, and restrictions (39:97)" from completely separated air transport activities as only method of implementing industrial funding
- Others pointed out necessity of operating the same in peacetime and wartime
- DOD gradually moved toward implementation of concept: DODD 5160.2 "Single Manager Assignment for Airlift Services" issued 7 Dec 56
 - Secretary of AF designated single manager
 - Other services directed to eliminate duplicative services
 - Organizational and operational plans prepared
 - Some reassignments began 1 Jul 57
 - By 10 Jul, revenue and accounting procedures developed and implemented (39:90-92, 93-96, 96-98, 100-109)
- Electronic Data Processing (EDP)
 - Why need EDP to support improved logistics management system
 - Need modern system to support nuclear combat forces
 - Need flexibility and sensitivity to changes
 - Need to meet world-wide demands in minimum time with maximization of resources
 - Present system does not provide data as precisely, accurately, or timely as needed
 - Logistics concepts changing
 - No longer pretense of economic abundance
 - No longer two to three years for mobilization
 - Possible emergencies vary in scale and location
 - Weapon systems and support greatly increasing in cost

--Logistics timing

---In 1776, supplies traveled at an average one and one third miles per hour

---By 1945, the speed had increased to three and one half miles per hour

---80% of the time is required for information flow

---EDP will shrink this information flow time (53:4-9)

--Implementation of EDP

---Logistics system has many functions, but all require information for management decisions

---Use of punched cards began 1940

---May 54, HQ USAF mandated revision of logistics system, with AMC having primary responsibility

---Electronic digital computers would be essential

---Jun 52, first computer installed HQ USAF (UNIVAC I)

---First one at AMC HQ in 1954

---FY 56, \$1 million rental costs, \$23.1 million in FY 61

---Many benefits, but many problems, too

---Managers lacked understanding of the technology, and some feared it

---Originally decided to study/use many different applications

----Gain experience quickly

----Gain appreciation of potential benefits

---Needed early payoff to justify expense and acquisition of equipment

---Tendency to try to do too much

----Moved fast, without regard for direction

---1956-60, tried to get program under control

- 1960, finally organized Directorate of Data Systems in AFLC
 - Standardization program
 - Updating equipment inventory
 - Strengthened internal management control
 - Training programs for in-house personnel
 - Developing advanced concepts
- Still problems without easy solutions
 - Early emphasis (1955-60) on mechanizing existing systems lead to many inefficiencies
 - Many systems not oriented toward base use
 - System developers tended to think in terms of isolated applications instead of AF-wide
 - Many top managers not convinced of worth of computers (38:1-8)

LESSONS 14, 15, & 16

TITLE OF LESSON: Vietnam War

METHOD OF PRESENTATION: Lecture, Guided discussion

STUDENT PREPARATION: Read "A Summary Assessment with Major Findings and Recommendations" report by the Joint Logistics Review Board

PLAN OF PRESENTATION:

- Before Jan 65, approximately 23,000 US troops in Vietnam, primarily as assistance
 - Included seven Air Force squadrons
 - Logistics facilities in place negligible; only port was Saigon, primarily civilian activities
- Massive build-up after decision in Jul 65 to deploy major combat forces
 - Statistics from 1 Jan 65 to 1 Jan 70 (Vietnam only)
 - Over 2 million people served
 - 17 million tons cargo by sea, 750,000 by air
 - \$4 billion construction program
 - Seven deep-water ports with 27 berths
 - 200 each heliports and small airfields, 8 major airfields, 12 runways
 - 11 million square feet covered storage
 - 1.8 million cubic feet reefer storage
 - 8250 hospital beds
 - Other major and minor logistics facilities
 - 163 million barrels POL consumed
 - Familiar logistics conditions

- ^---Undeveloped country, hostile environment
- Long supply pipeline
- Some advantageous conditions
 - Lines of communication (sea and air) unchallenged
 - Logistics operations in hostile area not attacked by air
 - Nonnuclear environment
- Unique conditions
 - Combat forces committed without lead time for preparation
 - Long-range planning hindered by incremental commitment of forces with changing objectives and requirements
 - Reserve forces and civilian industry not mobilized
 - High level control of all aspects of war
- Logistics planning
 - Commander in Chief, Pacific (CINCPAC) had developed detailed operations and logistics contingency plans prior to major commitment of forces to Vietnam
 - Shortfalls and limiting factors identified
 - Planning process had no provisions for followthrough
 - Result: identified shortfalls were not corrected
 - Port throughput capacity inadequate
 - Congestion in sea and aerial ports
 - Storage facilities inadequate
 - Loss of identity of material
 - Programming and budgeting process did not respond to shortfalls identified in planning
 - Plans were not modified to live with shortfalls
 - Commitment of personnel
 - Unwillingness to mobilize Reserves put severe constraints

on services, especially Army

---Personnel ceilings were also constricting

----Combat forces increased, then services had to provide extensive justification for support troops

---Appears civilian leadership making these decisions had not learned any lessons from previous wars concerning relationship between combat forces and logistics support (particularly, WW II, PTO)

--Ammunition procurement

---Production base could not expand as quickly as decisions made for incremental increases in combat commitment

---Army and Navy almost solely responsible for procurement

---Army and Navy responsible for conventional bombs - Army didn't even use them

---Air Force had no procurement responsibility

--Deployment of forces

--Incremental force increases brought corresponding changes in shipping requirements

---Civil Reserve Air Fleet (CRAF) not activated

---US commercial shipping not requisitioned

--Merchant Marine inadequate, Military Sea Transportation Service (MSTS) of WW II vintage

---Met requirements by shipping on commercial lines, activating National Defense Reserve Fleet, chartering foreign ships

--Airlift

---Primary method of moving personnel and critical supplies and equipment

---MAC initially had no suitable long-range jet transport

----C-141 increased airlift capability substantially

--Reception capability critical limiting factor, not air or sealoift

- By 31 Dec 65, 122 ships in Vietnamese waters awaiting unloading; other ships held up in Philippines, Okinawa, etc.
- Massive amounts of material overflowing depots and stored in open, without documentation
- WW II all over again! (33:3-10)
- This article (the major findings of the Joint Logistics Review Board) is very good, with an emphasis on lessons learned
- The discussion can be focussed in turn on each of the board findings and the current state of US forces in regard to those findings
- Discussion can also focus on previous conflicts (especially WW II) and why the appropriate lessons were not learned from them
- Logistics support of USAF activities
- Packaging
 - AFLC responsible for packaging services CONUS and SEA
 - High humidity and tropical rains complicated problems of insufficient warehousing
 - Requisite packaging for sufficient protection often not provided because of economic factors
 - AFLC shipped large empty skids and crates to SEA for return shipment of battle-damaged aircraft - significant requirements in cubic footage and weight
- Containerization
 - First developed by Army
 - CONEX container: steel, carried five tons, approximately seven foot cube
 - Carried on trucks, trains, and ships
 - Air Force also used palletized cargo
 - Army and USAF jointly owned 100,000 CONEXs early 65
 - Eventually, 150,000 retained in theater (6 million square feet covered storage): used for storage, dispensaries,

command posts, PXs, bunkers, etc.

---Air Force 463L System for palletizing unit loads for airlift

---Integrated system of conveyors, mobile loaders, forklifts, pallets, tie down equipment, and loading equipment

---C-141s and C-5s could also haul standard intermodal containers (58:III-4-14, III-4-16, III-4-19 to III-4-20, III-4-22 to III-4-23)

--Airlift traffic management

---Major shortfalls in documentation and intransit control of cargo; approximately 43% of all shipments had improper or missing documents

---Defense Transportation System (DTS) inundated by each service having separate requirements

---Standardization sought with Military Standard Transportation and Management Procedure (MILSTAMP)

----Ability to control shipments in DTS

----Standard procedures and terminology

----High-speed communication of transportation information

----Manual and automated techniques of documentation

----Forecasting of cargo movements

--MILSTAMP improved things but various factors kept it from reaching full potential

--Major abuses of priority system (see quotation on p. III-4-40)

----Everything requisitioned at highest priority, priority became meaningless

----Particular impact on airlift since high priority items usually shipped by air

----"Superpriorities" established in response: eventually similar abuses

----Eventually required commanding officers of requesting organizations to validate high priority requisitions

(58:III-4-37 to III-4-44)

- Task force established to study and offer suggestions for improvement of serious USAF vehicle maintenance problems in SEA
- May appear as trivially small portion of logistics effort, but can have serious impact, especially on flight line (munitions loaders, specialized transport unloading equipment, transportation of maintenance troops, hauling AGE)
- Problem functionally divided
- Manpower
 - Many units undermanned
 - Ratio of mechanics to vehicle equivalents usually one to eighteen; some SEA units as high as one to thirty
 - Emergency measures solved immediate problem but long term solution required application of more appropriate engineering standards and manning to fill them
- Quality of personnel
 - Shortages of senior supervisors (lack of career opportunity) and little or no training for airmen entering career field
 - Recommend all airmen have technical school training and shop experience before shipping to SEA
- Supply
 - Lack of spare parts most serious problem
 - Vehicle replacement program problems
 - Inadequate records on vehicles made it impossible to project replacement leadtimes
 - Improvements to stocking system for spare parts a necessity
 - Vehicle records must be accurate and vehicles replaced in a timely manner
 - Lack of shop repair facilities also contributed to vehicle out of commission rates (56:1-8)
- AFLC supply support in SEA

- DSA, GSA, and AFLC primary wholesale suppliers to bases
- Average of 8 million demands per year placed by users
- Long-range programs to delete old items and reduce inventory
 - SEA hindered effort due to certain aircraft reactivations: A-1E and B-26
- AFLC faced following worldwide requirements representing thousands of daily decisions and efforts:
 - 18,400 aircraft to support
 - 9.2 million flying hours per year
 - 73,000 engines
 - 7254 missiles
 - 84,000 separate line items of equipment
 - Avionics, fire control, and bomb-navigation systems
 - 197 bases; 71 overseas
 - 8600 organizations
- SEA consumption of JP-4 represented 16% of USAF worldwide total
- SEA requirements represented approximately 20% of total procurement requests at any one time
- Impossible to quantify entire magnitude of demands levied on system by SEA
- Logistics system converted from support of massive retaliation to inclusion of continuous conventional response
 - Mobility stocks predicated on remove and replace concept
 - Inadequate transportation did not allow return of repairable assets to CONUS for repair
 - Maintenance and procurement did not have pipeline filled
 - Although mobility system had built in reserves to allow for indecision, the period of indecision lasted too long
 - Force build-up of 1965 turning point toward establishing

adequate support of extended conventional operations

--Project Bitterwine

---Joint AFLC-PACAF project to establish 19 bases in permanent, self-sufficient complex in SEA

---10000 functional packages (base support packages, aircraft peculiar equipment, initial supply support kits) shipped from Nov 65 through early 67

----29 million units

----380,000 line items

----150 million pounds

----\$81 million

---Limited reception capability and storage facilities caused massive logjam of material

---Normal reporting requirements waived by AFLC

---Rapid area supply support (RASS) teams used to alleviate backlog and help set up standard supply system at SEA bases

--Due to changes in planned deployments, some stocks unavoidably sent to wrong places

---Redistribution programs set up to return these items to useful service and reduce amount of stock at any one base

--Procurement of supplies with incremental funding

---No long-range planning of supply buys because of periodic and unpredictable nature of escalation of hostilities

---Many small buys of same items repeated over and over

---Lead times increased by this incremental nature

---Industry production lead times also increasing, sometimes by as much as 200-300%

--As standard base supply functions established (including computers), elimination of "push" of certain stock items

---More compatible with CONUS concepts

---Could tie into worldwide single manager system, with

dramatic results

----Warehouse in Da Nang destroyed by enemy action:
resupply action on 10,000 line items of critical
communication and electronic equipment initiated within
36 hours; computer prepared requisitions

----However, what if computer had been destroyed also?

---Direct support logistics system resulted in highest
operational readiness and lowest not operationally ready
for supply rates in AF history (57:III-1-102 to III-1-113)

--Installation of computerized supply in SEA

---Initially, manual record keeping which was then replaced by
punch card system

---CONUS bases had computerized support

----Conversion difficulties as requisitions flowed between
the two

---Limitations delayed even conversion to punched cards

----Especially floor space and electrical power

----Shortage of key punch machines

---UNIVAC 1050-II selected as computer

----Others suggested based on availability and less
sophistication, but PACAF wanted UNIVAC for
compatibility with CONUS system

---Cam Ranh Bay first to go on line, Jun 66

---Experiences of Tan Son Nhut

----Conversion began 15 Oct 66, operational 15 Jan 67,
operated in conjunction with punch card system until
Apr

----Normally (CONUS), closed account during conversion
period - couldn't because of combat requirements

----Since Shaw AFB had same type of aircraft, decided to
use duplicate of their stock level data to save time

----However, Shaw's records showed lower priority noncombat
unit, so Tan Son Nhut was ordering supplies at lower

priority than other bases

----Also, Shaw had much greater maintenance capability so needed more parts; Tan Son Nhut ended up with an excess of 47,000 line items

---Each base had own conversion problems, but as learned from experience, each successive conversion easier (57:III-1-49 to III-1-52)

-Bare base mobile maintenance concept

--Concept developed early in war; original plan to accomplish all maintenance at Clark Air Base, Philippines

---Deploying units did not bring maintenance equipment with them

---Idea was to have mobile repair vans as shops for repair of aircraft parts

---PACAF and AFLC approved and procured equipment

---First discussed Jun 62, first van arrived Nov

---Eventually had six vans doing engine repair and overhaul, electronic, hydraulic, instruments, communications, and navigation equipment

--Resulted in higher in-commission rates and more constant mission capabilities (8:110-112)

-Vietnam logistics lessons learned

--Planning requirements

---Contingency plans had identified shortfalls but no action had been taken to correct them

---Lack of trained personnel and logistics command and control contributed greatly to inefficiencies

--Management information

---Virtually nonexistent

---No organized control structure, or standard or automated procedures

---Decisions made without proper analysis

--Direct logistics support

---Theaters no longer self-sufficient

---Direct, worldwide support of combatant theater

--Logistics command and control

---Competent, professional logisticians required to meet combat requirements

--Integrated logistics support

---Innovative, systems approach to attain effective combat support (31:76-80)

Concurrent (with war) logistics activities

-Maintenance Management Information and Control System (MMICS)

--System objectives

---Allow base level maintenance managers to accomplish mission and increase capability through more effective utilization of assets

---Support units of varying size, equipment, mission, and requirements

---Provide data for off base use

---Use computers whenever feasible

--Development method

---Complete description of current base level operating system

---System features and requirements development

---Field testing

--Specific system objectives

---Maintenance manager will have complete control; the computer will not make decisions

---Maintenance capability will be increased

---Only essential data will be collected; it will only be collected once

- Reports will be verbal, not coded, and generated as control levels are exceeded or on request
- MAJCOMs and local managers will be able to tailor the system to their needs
- Data provided off base will continue in current format
- Computer automation will be used whenever possible
- Limited local programming capability and optional programs will be available
- Units without a need for full computer support will be able to operate the system semi-manually
- A back up capability will operate whenever the computer is down
- Specific subsystems
 - Training: forecasting, scheduling, and evaluating
 - Job control: control on-going jobs, plan unscheduled jobs, reduce record and communications workload
 - Plans and scheduling: forecast requirements, adjust workloads, select equipment, evaluate schedule changes
 - Materiel control: forecast and verify requirements, detect materiel problems
 - Analysis: trend analysis and prediction to reduce schedule deviations, improve recovery procedures, detect impending problems, evaluate schedule changes
 - Quality control: evaluation and improvement of quality
 - Administrative: mechanized record keeping
- MMICS field tests in 1970 with HQ USAF decision in Dec (50:1-1 to 1-11, 1-18)
- Discussion: evaluate above in view of what MMICS actually does
- Titan II resident logistics teams
 - In response to initial provisioning problem in Titan II program
 - Initial provisioning: spares determination for period of

- initial service of new weapon system
- Initial provisioning would not be completed soon enough
- Joint solution developed by San Bernardino Air Materiel Area (SBAMA), AFLC, Ballistic Systems Division of AFSC, and Martin Company
- Resident team in contractor's plant to accomplish source coding and provisioning actions
- Eliminated much documentation required previously
- Provided on th spot evaluation of contractor spares selections without paperwork turnaround time
- Data collection and computations streamlined
- Team members
 - Chairman
 - Maintenance representative
 - Supply representative
 - Cataloging/interchangeability representative
 - Provisioning control technician
- Provisioning is joint effort with contractor as engineering data is released
- Results
 - Reduced documentation costs
 - Reduced provisioning conference costs
 - Reduced man-hours required
 - Improvement in quantities of spares provisioned
- Same concept applied to Minuteman program and possibly other major weapon systems (13:113-114)
- Phase-out of three air materiel areas (AMA)
- SecDef McNamara announced closing of 95 military installations on 19 Nov 64

- Resulted in acute operational disruptions and significant personnel losses
- Objectives of closings
 - Increase utilization of facilities while reducing operating costs
 - \$477 million annual saving without loss of capability
 - Added to previous 574 announced closings, \$1.7 billion total annual savings
 - 1.5 million acres land released
 - 150,000 fewer people
- AFLC required to submit to SecDef by 24 Sep, study to describe:
 - Consolidation of depot maintenance into five facilities
 - Rationale for phasing out those chosen
 - Plan for orderly phase out
- AFLC listed Middletown, Mobile, and San Bernardino as most expendable, but did not concur with consolidation
 - People would be reluctant to transfer, resulting in degradation of support to operations
 - Estimated cost of realignment \$42 million if remaining functions at the AMAs were maintained
- AFLC scheduled one closing at a time
 - Mobile first, Middletown second, then San Bernardino
 - \$9 million construction funds necessary for gaining bases
- Directed to close all three during FY 1966-1969
 - Construction estimates further reduced to \$3.8 million
- Relocation of responsibilities
 - Ogden to assume majority of San Bernardino's responsibilities
 - Mobile functions to Sacramento and Warner Robins

- Middletown transfer more complicated, had more first line systems; most to Sacramento and Warner Robins, with a few to Wright-Patterson and other depots
- Major concerns within AFLC
 - Compliance with DOD policies regarding personnel displacements
 - Programming plans for the transfers (6:1-2, 24-34) .
- Continuing discussion of logistics doctrine and concepts during this time period; the following is an example
 - Characteristics of logistics; basis of controlling principles
 - Tangibility: can be seen and touched
 - Perishability: subject to deterioration, decay, destruction
 - Measurable: with varying degree of accuracy
 - Unstable: of a dynamic nature
 - Resultant: exists from effects of other forces
 - Principles of logistics
 - Unity of effort: of entire DOD toward common goal
 - Maximum integration: parallel policies and procedures throughout DOD
 - Full utilization of force: maximum use of intrinsic capabilities
 - Basic principles
 - Principle of logistics generation: springs from outside influences and decisions
 - Principle of logistic equilibrium: logistics must be a balance of factors (forces, strategy, tactics, resources, time)
 - Quasi-laws of logistics
 - Strategy, tactics, logistics mutually interdependent, interrelated elements of war

- Logistics sensitive to time, environment, human performance
- Logistics is an element of deterrence because it is a determining factor in military readiness
- Logistics must be secured from disruption because it is the nation's means of war (42:19-26, 30-41)

LESSONS 17, 18, & 19

TITLE OF LESSON: Post-Vietnam (A Potpourri of Ideas, Activities, and Concerns)

METHOD OF PRESENTATION: Lecture, Guided discussion

STUDENT PREPARATION: Read "The Joint Logistics Commanders; Another Bureaucratic Arrangement?;" "System Audit Appraisal of Maintenance Management Information and Control System;" and "More Maintenance in OMS" pp. 75 to end

PLAN OF PRESENTATION:

-The Joint Logistics Commanders (JLC)

--Why started

---Since WW II, ratio of acquisition spending to operations spending has reversed itself until operations is approximately 70% of budget

---DOD wanted to control this trend

---All logistics organizations of services were fragmented, and each had started consolidation and reorganization

---Apparent that there were advantages to communication and cooperation among services

---Two main reasons for starting JLC: bridge communications gap between logisticians of different service; form another tool for reversing spending trend

--How is JLC organized

---First meeting 28 Mar 66

---Groups or panels report to secretariat which reports to JLC

---Meet at least once per quarter, more often if necessary

---Commanders of Army Materiel Command (AMC), Navy Material Command (NMC), AFLC, and AFSC

---Meetings rotated between commands

---Not a policy-making body, can recommend and forward ideas

through channels

--What has JLC accomplished

---Developing optimization algorithm for electronic warfare equipment

---Joint manuals on munitions effectiveness

---Half billion dollars saved in ammunition procurement by developing management decision models

---Saved more by consolidating training of calibration and metrology personnel

---Navy saved \$300,000 by using USAF data on remotely piloted vehicles

---Studies of consolidation of depot maintenance

--Does it work

---Yes

---Formed voluntarily to fill jointly perceived need

---Small, flexible, and responsive and has produced results (41:27-30)

-LOGAIR and the need for improvements

--Trends indicating improvements needed

---LOGAIR claims 2.5 day transit time for Mission Capability (MICAP) shipments, industry standard has become "overnight"

---Reduced spares have impacted readiness, better LOGAIR can reduce repair cycle time

--System in place

---Four hubs: Hill, Kelly, Robins, and Wright-Patterson AFBs

---Daily service to 58 Air Force installations

---Off-line services (usually by truck) to 908 other DOD activities

---High priority shipments: MICAP, Transportation Priority 1 (TP-1), and TP-2

- Lessons learned from industry: Federal Express Corporation (FEC)
 - Single hub, selected for good weather conditions and proximity to center of gravity of package movements
 - Each day, each aircraft flies to hub, is unloaded and reloaded overnight, and returns to home base next day
 - All cargo flows into and out of central hub every day
- LOGAIR Mark 2 (Mk 2) (proposed)
 - Single hub at Tinker AFB
 - All cargo to bases originates at Tinker every day, cargo from bases terminates at Tinker
 - Level of workload and required timing feasible
 - Projected absolute worst case maximum transit time 2 days, absolute best case minimum time .5 days
- Changes brought about by Mk 2
 - Essentially identical of better service
 - No changes for feeder stations
 - ALCs' tasks greatly simplified - reduction in work force
 - Increased operating costs due to greater mileage
 - Require capital investment at hub to handle increased traffic
 - Savings in inventory/pipeline costs
- Recommended evaluation of potential of this proposal by HQ USAF (62:25-29)
- Need for integration of national military strategy and logistics
- Economic-industrial considerations primary factors in meeting national objectives
 - Logistics considerations must be taken into account when objectives developed
 - Logistics must be considered at highest level of government with strategic decisions

- Decision making fragmented
 - Many levels and organizations within Executive Branch, as well as Congressional involvement
 - Desirable to have one agency responsible for integrating strategy and logistics
- Integration should be performed by National Security Council (NSC) or Council of Economic Advisors (CEA)
 - Preferably combination of two
- Integration of NSC and CEA
 - Make Chairman OF CEA a member of NSC with responsibility for logistics considerations (20:61-67)
- Discussion
 - There is an obvious need for this type of action; look at Vietnam, deployment and operational decisions were made in White House, but logistics was not discussed
 - Question the appropriateness of economists having the responsibility for logistics; how much do they know of subject
- Audit of War Readiness Spares Kits (WRSK) 1974
 - WRSK held in readiness for deployment, contain spares, repair parts, and related maintenance supplies
 - Jointly developed by MAJCOMs and AFLC
 - Materiel facilities branch responsible for condition of WRSK
- Audit
 - 11 USAF bases
 - 3 AFRES bases
 - 5 ANG bases
 - Reviewed authorizations, inventory procedures, storage, security, issue/replenishment procedures, control of dated and functional check items, and personnel training

- Findings
 - General procedures and practices satisfactory
 - Authorizations for WRSK assets at base level did not agree with AFLC authorizations
 - Withdrawals from WRSK stocks made without determining availability of other stocks
 - Inadequate surveillance over functional check items
 - Personnel training inadequate (48:1-3)
- What are the implications for mobility capabilities of these findings?
- Proposals for a responsive logistics transportation system (RLTS) for Europe
 - Any future European conflict will require high sortie rates
 - In turn requires sufficient spares and repair facilities
 - Currently, USAF objective to make European bases self-sufficient in spares and repair capability during opening of conflict
 - Realities of combat work against self-sufficiency
 - Unanticipated shortages due to sortie rates, aircraft attrition, repair capability, enemy damage to facilities and inventory
 - Mutual support among bases will be required
 - RLTS should be designed to accomplish this mutual support
 - Mutual support already required in peacetime; 1000 lateral support shipments for USAFE in 1979
 - Cannot stock enough parts at each base to obviate need; still would not negate above mentioned combat conditions
 - RLTS should provide continuous, responsive service to each base, at least once per day
 - Use surface and air transport
 - Minimum command and control

- Connect bases with similar aircraft types
- RLTS modeled using Dyna_METRIC and TSAR
 - Increased combat availability by 40 to 300 aircraft, depending on conditions of simulation
 - Present system would need \$200 to \$600 million in additional stock to equal
 - RLTS price \$60 to \$110 million (10:v-viii)
- Audit of Maintenance Management Information and Control System (MMICS)
 - Relate to previous lecture on objectives of MMICS
 - Audit conducted during test phase of MMICS implementation
 - Overall evaluation
 - Concept good, but major deficiencies
 - System should be modified before complete implementation
 - Findings
 - Excessive degree of computerized control over maintenance and training; driving technicians to develop ways to "beat the system"
 - Complex file structure significantly slowed processing time
 - Immediate access storage inefficiently used because of data base design
 - Restoration procedures after computer downtime ineffective; inadequate control over data collection lead to inaccuracies; some management products require multiple inquiries
 - Implementation costs, remote terminal operator manning, and mobile remote terminal should be more thoroughly analyzed prior to decision on Air Force-wide implementation (49:1-3)
 - Discussion: were these findings corrected before implementation?
- Crew chiefs vs. POMO concept
 - Maintenance Posture Improvement Program (MPIP)

- Shortfalls in sortie generation because of maintenance capability and training
- MAJCOM directors of maintenance formed executive committee
- Tasked to scrutinize following:
 - Manpower utilization
 - Maintenance personnel training
 - Ground equipment modernization
 - Aircraft shelters
 - Hardening of maintenance facilities
 - Dispersal of shops
 - Maintenance organizational structure
 - Other areas
- Israelis able to generate tremendous number of sorties during Yom Kippur War
 - USAF wanted to know how they did it
- Israelis had specialists assigned to flightline instead of dispatched from shops; all personnel worked together on launch and recovery
- MPIP agreed this was inappropriate for airlift and strategic aircraft
 - Recommended standardization of maintenance concept by weapon system and mission instead of Air Force-wide
- Production Oriented Maintenance Organization (POMO)
 - TAC tasked to develop and test Israeli type maintenance on 9 Sep 74
 - Test conducted on entire wing of F-4Es at MacDill AFB and one flight of F-15s at Luke AFB
 - Designed to eliminate slack time and travel time of specialists
 - Takes advantage of natural split between on and off

equipment maintenance

- Specialists who normally work on aircraft assigned to flightline organization
- Key element is cross training specialists to perform simple, routine aircraft general (APG) work
- Designed to decrease turnaround times (more bodies to do it), produce more sorties, provide specialists with greater sense of mission and job enrichment
- Control of launch and recovery actions decentralized to flightline, job control reduced to monitoring and coordinating necessary support

--Advantages of POMO

- Reduced mobility accounts
- Standardized OMS bench stocks
- Enhanced powered AGE delivery and maintenance
- Quicker response time and more effective utilization of specialists
- Improved communication between operations and maintenance

--Disadvantages of POMO

- Maintenance squadron size increased
- Decentralization caused lags in reporting of aircraft status
- Doubts raised as to quality of maintenance
- Specialists morale problems due to lack of proficiency and uncertainty of career progression
- Heavily increased training requirements

--Results

- Statistical evaluation of results inconclusive
- "Gut level" reactions of maintenance managers was positive
- Hawthorne Effect: those being watched improve simply because they're being watched (11:75-86)

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SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED			1b. RESTRICTIVE MARKINGS									
2a. SECURITY CLASSIFICATION AUTHORITY			3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution unlimited									
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE												
4. PERFORMING ORGANIZATION REPORT NUMBER(S) AFIT/GLM/LSM/84S-64			5. MONITORING ORGANIZATION REPORT NUMBER(S)									
6a. NAME OF PERFORMING ORGANIZATION School of Systems & Logistics		6b. OFFICE SYMBOL (If applicable) AFIT/LS		7a. NAME OF MONITORING ORGANIZATION								
6c. ADDRESS (City, State and ZIP Code) Air Force Institute of Technology Wright-Patterson AFB, Ohio 45433			7b. ADDRESS (City, State and ZIP Code)									
8a. NAME OF FUNDING/SPONSORING ORGANIZATION		8b. OFFICE SYMBOL (If applicable)		9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER								
8c. ADDRESS (City, State and ZIP Code)			10. SOURCE OF FUNDING NOS. <table border="1"><tr><td>PROGRAM ELEMENT NO.</td><td>PROJECT NO.</td><td>TASK NO.</td><td>WORK UNIT NO.</td></tr><tr><td></td><td></td><td></td><td></td></tr></table>		PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.	WORK UNIT NO.				
PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.	WORK UNIT NO.									
11. TITLE (Include Security Classification) See Box 19												
12. PERSONAL AUTHOR(S) Karen S. Wilhelm, B.S., Captain, USAF												
13a. TYPE OF REPORT MS Thesis		13b. TIME COVERED FROM _____ TO _____		14. DATE OF REPORT (Yr., Mo., Day) 1984 September								
15. PAGE COUNT 141												
16. SUPPLEMENTARY NOTATION Approved for public release; LAW AFR 190-17, Lynn E. Wolaver Dean for Research and Professional Development Air Force Institute of Technology (AFIT) 14 Sept 84												
17. COSATI CODES <table border="1"><tr><td>FIELD</td><td>GROUP</td><td>SUB. GR.</td></tr><tr><td>15</td><td>05</td><td></td></tr></table>			FIELD	GROUP	SUB. GR.	15	05		18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number) Air Force Logistics Command, Education, History, Logistics, Logistics Support, Warfare			
FIELD	GROUP	SUB. GR.										
15	05											
19. ABSTRACT (Continue on reverse if necessary and identify by block number) Title: A COURSE IN AIR FORCE LOGISTICS HISTORY SINCE 1940 Thesis Chairman: Mr. Jerome G. Peppers, Jr.												
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT UNCLASSIFIED/UNLIMITED <input checked="" type="checkbox"/> SAME AS RPT. <input type="checkbox"/> DTIC USERS <input type="checkbox"/>			21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED									
22a. NAME OF RESPONSIBLE INDIVIDUAL Jerome G. Peppers, Jr., Professor		22b. TELEPHONE NUMBER (Include Area Code) 513-255-6857		22c. OFFICE SYMBOL AFIT/LS								

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The objective of this research was to design a three quarter hour, graduate level course in Air Force logistics history since 1940. This effort was a continuation of a previous thesis effort which identified approximately 450 bibliographic references. These references were then used as a basis for designing lesson plans, lecture outlines, and a student syllabus, and identifying student reading assignments.

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